SPECIAL OVERSIGHT BOARD FOR DEPARTMENT OF DEFENSE INVESTIGATIONS OF GULF WAR CHEMICAL AND BIOLOGICAL INCIDENTS

Final Report

December 2000

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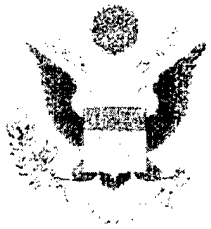

Presidential Special Oversight Board for Department of Defense Investigations of Gulf War Chemical and Biological Incidents

December 20, 2000

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Vice Chairman

Hon. Jesse Brown

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RADM (Ret.) Paul E. Busick

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LTC (Ret.) Roger Kapian

The Honorable William S. Cohen
Secretary of Defense
1000 Defense Pentagon
Washington, DC 20301

Dear Secretary Cohen:

In accordance with Executive Order 13075 and the Presidential directive of January 31, 2000 (see Appendix B), I am submitting the *Final Report* of the Special Oversight Board.

The Board regrets that Vinh Cam, Ph.D., does not agree with certain sections of the report. Unlike the other board members, she did not respond to staff requests for input or inquire about the progress of the final report until she received a coordinating draft in November.

Dr. Cam's dissent details her concerns and contains several assertions with which the other board members disagree. Her comments and my response can be found in Appendix A.

Sincerely,

Warren B. Rudman
Chairman

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This Report is Dedicated to the Memory of

Admiral Elmo R. Zumwalt, Jr. (1920-2000)

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THIS REPORT IS DEDICATED TO THE MEMORY OF

Admiral Elmo R. Zumwalt, Jr. (1920-2000)

Admiral Elmo R. Zumwalt, Jr., of Arlington, Virginia, was a retired Admiral with the United States Navy and a former member of the Joint Chiefs of Staff. Born on November 29, 1920, in San Francisco, California, Admiral Zumwalt graduated from the United States Naval Academy and became both the youngest four-star admiral in history and the youngest person ever to serve as Chief of Naval Operations. He was Commander of United States Naval Forces in Vietnam from 1968 to 1970, where he served with his son, Naval Officer Elmo Zumwalt III. In 1988, Admiral Zumwalt's son died of cancer related to contact with Agent Orange in Vietnam. *My Father, My Son* was co-authored in 1986 by Admiral Zumwalt and his late son and is an account of their Vietnam experiences and the tragedy that resulted. Admiral Zumwalt retired from the Navy in 1974 and served as a member of the President's Foreign Intelligence Advisory Board. He was a Director of a number of corporations, including Dallas Semiconductor, Magellan Aerospace and NL Industries. He was a founder of and served as Chairman of the Marrow Foundation. He also was a member of the U.S. Navy Memorial Foundation, the Ethics and Public Policy Center, the Hudson Institute, and the Council of Foreign Relations. In 1998, the President of the United States awarded Admiral Zumwalt the Medal of Freedom, the nation's highest civilian honor; that same year, the President appointed the Admiral to the Presidential Special Oversight Board for Department of Defense Investigations of Gulf War Chemical and Biological Incidents.

Admiral Zumwalt passed away on January 2, 2000.

He was a patriot and a gentleman.

On April 4, 2000, at a Board meeting held at the White House Conference Center, Washington, DC, the Board passed a motion dedicating the Board's *Final Report* to the memory of Admiral Elmo "Bud" Zumwalt, Jr. On July 4, 2000, President William Jefferson Clinton announced that the Navy will honor

Navy Adm. Elmo R. "Bud" Zumwalt, Jr., by naming its 21st Century Land Attack Destroyer (DD 21) after him. Appropriately, this class of 32 future warships will embody Zumwalt's visionary leadership and well-known reputation as a Navy reformer.

EXECUTIVE SUMMARY

FINAL REPORT

President Clinton established the Special Oversight Board by Executive Order 13075 in response to a recommendation from the Presidential Advisory Committee on Gulf War Illnesses (PAC). The Board's charter (Appendix C) called for it to "provide advice and recommendations [and oversight] ... of Department of Defense investigations into possible detections of, and exposures to, chemical or biological weapons agents and environmental and other factors that may have contributed to gulf war illnesses ... [and to provide an] overall evaluation of DoD's plan for and progress toward the implementation of the 12 recommendations contained in the PAC's Special Report", (see Chapter 5).

Board operations began in June 1998 by focusing on the work of the Office of the Special Assistant for Gulf War Illnesses (OSAGWI), the primary DoD agency responsible for coordinating DoD's Gulf War investigations in this area of concern. The Board solicited the opinions of veterans groups, individual veterans, and scientists researching the etiologies of Gulf War illnesses. Since the release of its *Interim Report* in August 1999, the Board has conducted four public hearings and eight monthly meetings that have included presentations from DoD and Department of Veterans Affairs agencies (VA).

This final report addresses:

- the transition from OSAGWI to OSAGWIMRMD (Office of the Special Assistant for Gulf War Illnesses, Medical Readiness, and Military Deployments),
- OSAGWI case narratives,
- OSAGWI environmental exposure reports,
- Presidential Advisory Committee *Special Report* recommendations,
- an overview of Gulf War illnesses (GWI),
- the role of stress as a contributing factor in Gulf War undiagnosed illnesses,
- lessons learned from the Gulf War and ongoing initiatives, and
- Board findings, recommendations, and observations.

The Transition from OSAGWI to OSAGWIMRMD

The Deputy Secretary of Defense established OSAGWI on November 12, 1996, following DoD revelations that U.S. and coalition forces may have been exposed to low-level nerve agents from the destruction of Iraqi ammunition stores at Khamisiyah, Iraq. OSAGWI endeavored to determine the causes of Gulf War illnesses, to ensure that veterans were receiving proper care, and to recommend to the Secretary of Defense changes in doctrine, policy, and procedures to reduce the risks to troops during future deployments. OSAGWI has published seventeen case narratives and four environmental exposure reports as a result of its investigations into possible chemical and biological incidents and into environmental factors that may have contributed to adverse health outcomes. In addition, OSAGWI has devoted considerable effort to providing veterans, military personnel, and the public with timely and accurate information regarding Gulf War illnesses and related issues. Because of the success of OSAGWI's efforts and the need for continued research into the causes of Gulf War undiagnosed illnesses, the Board recommended that DoD create a follow-on organization to OSAGWI. This new organization, OSAGWIMRMD, will not only continue to focus on Gulf War illnesses but also will examine future force health protection issues.

OSAGWI Case Narratives

As of November 30, 2000, the Board has reviewed fourteen original and nine revised case narratives released by OSAGWI and OSAGWIMRMD (see Appendix F). The Board finds OSAGWI made assessments that were consistent with available evidence in all of its case narratives regarding the presence of chemical and biological warfare agents. The only known potential exposure of U.S. personnel to chemical warfare agents remains the accidental low-level release of nerve agents during demolition operations at Khamisiyah, Iraq, in March 1991.

OSAGWI Environmental Exposure Reports

As of November 30, 2000, the Board has reviewed three original and two revised environmental exposure reports (see Appendix F). The Board finds OSAGWI made assessments in each of its reports regarding environmental exposures that were consistent with available evidence. In particular, the Board concurs with the conclusions in the report on depleted uranium (DU) that available evidence does not support claims that DU caused or is causing the undiagnosed illnesses (or diagnosed illnesses) from which some Gulf War veterans still suffer. The Board agrees with the report on Chemical Agent Resistant Coating (CARC) that this special camouflage paint posed a health hazard only to the approximately 200 personnel who participated in spray-painting operations. The Board concurs with the reports on oil well fires that contaminant concentrations (less particulate matter) in the smoke were below those known to cause short- or long-term health effects and that, except for the possibility of exacerbating some pre-existing respiratory conditions, long-term health effects are unlikely. However, ongoing research must be completed and assessed before OSAGWIMRMD can make a final determination on oil well fires.

Presidential Advisory Committee Special Report Recommendations

The Board addressed the twelve PAC recommendations during several of its monthly meetings. Representatives from DoD, VA, and the Department of Health and Human Services (DHHS) described each agency's efforts to implement the recommendations. The Board has determined that DoD properly implemented ten of the recommendations. The Board advised DoD to take no further action on two recommendations:

> 1) "The White House should develop a plan to ensure Gulf War veterans and the public have access to and can be represented in the future deliberations about possible CBW agent exposures." The formation of the Presidential Special Oversight Board accomplished this recommendation.
>
> 2) "DoD should identify all individuals within a 300-mile radius from the Khamisiyah pit and conduct an additional, complementary notification." The Board has determined that OSAGWI's intensive analyses of the Khamisiyah event, with the subsequent revision of potential troop exposures, fulfilled the intent of this recommendation.

Overview of Gulf War Illnesses

The Board reviewed numerous published scientific studies on Gulf War illnesses. The Board also heard direct testimony from many of the primary authors of these studies. Based on this information, the Board evaluated ten potential exposures possibly associated with Gulf War illnesses. These exposures include: biological warfare agents; chemical warfare agents; depleted uranium; indigenous infectious diseases; oil well fires; pesticides; pyridostigmine bromide; sand; vaccines; and stress.

The Board makes the following conclusions:

- A substantial number of Gulf War veterans suffered significant illness, impairment, and disability following their deployment to the Persian Gulf.
- Studies published to date have not identified a cause of undiagnosed Gulf War illnesses.
- The symptoms of Gulf War undiagnosed illnesses are similar to those found in the general population and are similar to those of veterans returning from combat duty in previous wars and from contemporary peacekeeping duties.
- The symptoms of Gulf War undiagnosed illnesses are similar to those of patients suffering from chronic fatigue syndrome, fibromyalgia, and multiple chemical sensitivity.
- Deployment stress is a likely causal or potentiating factor in at least some Gulf War veterans' illnesses.
- Epidemiological studies of Gulf War veterans are compromised because exposure estimates for many factors are of poor quality or are nonexistent. Self-reported exposures, which are subject to recall bias, misinformation, or other confounding variables, are often the only exposure data available.
- Further research is necessary to evaluate the potential relationship between toxic exposures and symptoms of undiagnosed Gulf War illnesses.

The Role of Stress as a Contributing Factor in Gulf War Undiagnosed Illnesses

The Board concludes that stress is likely a primary cause of illness in at least some Gulf War veterans; it is a likely secondary factor in potentiating other causes of undiagnosed illnesses among some Gulf War veterans. The Board recognizes that veterans suffering from undiagnosed illnesses, even if caused by deployment stress, have real medical problems that pose a significant disruption in their lives.

An unfortunate reluctance exists on the part of the American public, some members of Congress, and especially among some members of the veteran community to recognize the impact that stress can have on an individual. These attitudes stem from a misunderstanding of the very real physiological and biochemical impact that stress can have on the human body. Stress can lead to genuine illnesses. No physician or researcher familiar with the effects of stress minimizes the suffering that patients often experience. The symptoms are indeed real; they are not imagined and they are not "all in the head." The fact that stress is a likely factor in some Gulf War veterans' illnesses does not imply that other potential exposures played no role. This issue requires continued research. The Board commends DoD for recognizing the role of stress in deployment and in combat and for developing and implementing programs to address this issue.

Lessons Learned in the Gulf War and Ongoing Initiatives

The Board commends the Departments of Defense, Veterans Affairs, and Health and Human Services for the many programs that they have initiated or will shortly implement to promote the health of service members and their families following future deployments.

These programs include:

- Periodic Health Assessments (DoD)
- Deployment Medical Surveillance Assessment Status (DoD)
- Unmet Health Needs of Reservists (DoD)
- Prevention/Treatment of Deployment Related Stress (DoD)
- Predisposing Psychiatric Problems/Risk Factors (DoD)

- Responding to Health Needs/Concerns of Returning Troops (DoD)
- The Family's Role Related to Deployment (DoD)
- Deployment-related Health Issues/Veterans Health Initiative and Veterans' Health Programs for Latent Post-war Illnesses (VA)
- Environmental and Occupational Health Programs and Research and Deployment Occupational/Environmental Health Surveillance (DoD)
- Role of Medical Intelligence and Detection of Potentially Hazardous Environmental Exposures (DoD)
- Research on Health Effects of Low-Level CW Agents (DoD)
- Interagency Medical Defense Program Against CBW Agents (DoD)
- Medical Force Protection: Advance Concepts and Technology (DoD)
- Detecting/Mapping Potential Hazardous Health Exposures and Detecting Potential Biological Agents (DoD)
- Interagency Health Risk/Research Communication Program (DoD, VA, DHHS)
- Personnel Record Keeping/Tracking (DoD)
- Documenting Recruits' Health Status and a Lifetime Health Record (DoD)
- Automated System to Collect Pertinent Personnel/Health Data and Data Dictionary for Comprehensive Health Record (DoD and VA)

Findings, Recommendations, and Observations

Findings

- The Department of Defense and OSAGWI have worked diligently to fulfill the President's directive to "leave no stone unturned" in investigating the possible causes of Gulf War illnesses.
- DoD has made no effort to deliberately withhold information from the general public or from veterans concerning its investigations or findings related to Gulf War illnesses. On the contrary, DoD has made an extraordinary effort to publicize its findings through the publication of reports and newsletters, public outreach meetings, briefings to veterans and active duty servicemembers, the creation of a toll-free hotline, and the creation of an actively updated website.
- In each of its case narratives, OSAGWI made assessments regarding the presence of chemical and biological warfare agents that were consistent with available evidence.
- In each of its environmental exposure reports, OSAGWI made assessments regarding environmental exposures that were consistent with available evidence.
- Following a recommendation of the Board in its *Interim Report*, OSAGWI revised its case narrative methodology statement to fully explain its procedures, resulting in an accurate method for assessing the likelihood of chemical warfare agent exposures during the Gulf War.
- The Department of Defense appropriately implemented the recommendations contained in the PAC's *Special Report*.

Recommendations:

- The Board recommends that OSAGWIMRMD suspend its installation visits until it can devise a more efficient vehicle for conducting town hall meetings while maintaining its informative world-wide web site, 1-800 toll-free operators, and other existing outreach initiatives. The VA should assume the lead for Gulf War illness-focused town hall meetings because veterans' questions have centered on that department's services. OSAGWIMRMD should assume a supporting role in such meetings, and the Military and Veterans Health Coordinating Board (MVHCB) should facilitate the transfer of responsibility from DoD to VA for Gulf War illness-focused town hall meetings. OSAGWIMRMD should use those meetings to inform the

public about its new responsibilities and use DoD news media, installation visits, and other initiatives to ensure that the active and reserve components of each military service also understand the organization's enhanced mission. (Chapter 2)

- The Board concurs with Dr. Harold Sox, chairman of the recent Institute of Medicine (IOM) study on Gulf War exposures, that combat stress should be investigated by the IOM with the same academic and scientific rigor that was used to evaluate other Gulf War exposures whose investigation Congress mandated. (Chapter 7)
- The Board recommends that OSAGWIMRMD be an active participant in the development and implementation of the life-cycle military health record. (Chapter 8)
- The Board recommends that OSAGWIMRMD and the MVHCB develop their mission requirements in support of meeting the needs of the reserve components. (Chapter 8)
- The Board recommends continued support and extension of the MVHCB concept, charter, and strategic plan and further encourages the respective departments to provide senior level endorsement, participation, guidance, funding, and staffing for the MVHCB. (Chapter 8)
- The Board recommends that the MVHCB and OSAGWIMRMD monitor developments by the Defense Integrated Military Human Resources System (DIMHRS) to resolve deficiencies and duplication in personnel management systems. (Chapter 8)
- The Board recommends that DoD and OSAGWIMRMD include the "cradle to grave" health record concept for all U.S. military members in its top-ten priorities list. This should include the computerized health record currently under development. (Chapter 8)
- The Board recommends that DoD, VA, and DHHS continue to apply lessons learned to their efforts to create a comprehensive health record for each veteran. The Board recommends that the MVHCB be integrated into the planning activities directed at the government computerized multidepartmental patient record concept in an ex officio status. (Chapter 8)
- The Board recommends that OSAGWIMRMD and the MVHCB closely monitor the development and resourcing of DoD's research on the health effects of low-level CWA exposures and make recommendations as appropriate to ensure continued progress in this area. (Chapter 8)
- The Board recommends that the MVHCB remain the focal point for the collective efforts of its chartering sponsors and that the recommendations of the MVHCB represent a synthesis of the individual departmental efforts. (Chapter 8)

Observations:

- The Department of Defense has acted responsibly, decisively, and in good faith in responding to the President's charge to "leave no stone unturned" in the search for the cause(s) of the undiagnosed illnesses from which some Gulf War veterans still suffer.
- Science alone should determine whether a Gulf War illness or syndrome exists. To date, research has not validated any specific cause of these illnesses, and the general population experiences the same symptoms associated with the undiagnosed illnesses of some Gulf War veterans.
- Government agencies must continue to address the challenging Gulf War veterans issues of medical research, health care delivery, and disability claims processing.
- The Board strongly believes that efforts to fund non-peer-reviewed research projects do not serve the best interest of the nation or of its Gulf War veterans. Researchers and clinicians who advocate "alternative" diagnostic and treatment methods, as well as those proposing more conventional approaches, should be encouraged to respond to Requests for Proposal and Broad Area Announcements with well-constructed proposals capable of passing vigorous and independent peer review.
- The Board notes that the executive and legislative branches of government do not have a mechanism to budget and to appropriate funding for health care, rehabilitation, and disability compensation costs that arise after every major conflict or military deployment involving hostile

fire. The two branches should develop a budgetary process that automatically incorporates funding for these post-deployment services into the operational costs of a deployment. For example, when the Secretary of Defense estimates to the President the cost of a major operational mission (e.g., Desert Storm/Desert Shield), the estimate should include an allowance for follow-on medical care and treatment for the U.S. Government participants (military and U.S. Government civilian, not contractors). This cost, when funded, could serve as a mechanism for the DoD and VA to provide medical care for veterans and military personnel suffering from illnesses of unknown etiology which were not present or identified prior to the operation or deployment.

- The Board believes that DoD should fully support the Millennium Cohort Study and that the service members selected to participate in the program should cooperate fully. This twenty-year research project will significantly enhance the Federal Government's and the medical community's understanding of the long-term health consequences of military service and facilitate improved clinical care and force health protection for members of the Armed Forces. The study will provide better insight into the possible health effects of service in Bosnia, Kosovo, Southwest Asia, and future deployments and also contribute to VA's development of services that will meet the needs of veterans who have participated in overseas operations.
- The Board notes that DoD and VA do not share a core set of questions used in Gulf War illness studies, especially epidemiological studies. The two agencies should consult with the Centers for Disease Control and Prevention's National Center for Health Statistics to design a core set of questions that will result in responses that are comparable with those from other national surveys (i.e., NHIS or NHANES). DoD and VA lose the advantage of comparability of response to survey data from the general population when their questionnaires are not compatible with existing surveys.
- The Board believes that DoD and/or VA should conduct a time series geographical information system analysis from a random sample of deployed Gulf War veterans to identify whether any health outcome clusters occurred in the Kuwaiti Theater of Operations.
- The Board notes that the U.S. Government's haste to respond to media and public expectations for definitive answers to the unintentional release of chemical warfare agents at Khamisiyah stimulated distrust of the government among many veterans and others as inaccurate initial estimates gave way to a flurry of increasingly more accurate, yet ever changing, revisions. The Board strongly believes that the public has the right to receive timely, accurate, and supposition-free information on matters of such grave import. Accordingly, the government must acknowledge when it possesses insufficient information to make an accurate assessment and resist the temptation to make definitive statements in the absence of reliable environmental and meteorological data, in-depth modeling, and careful analysis. Failure to do so will cause some veterans and others to falsely accuse the government of a cover-up and prompt many veterans to attribute their illnesses to exposures that did not occur, could not have occurred, or were too small to cause even transient observable effects.

The Board included twelve recommendations in its *Interim Report*. DoD and OSAGWI have complied or are complying with the eight recommendations that remain valid.

- The Board recommends that the Special Assistant (OSAGWI) report to the Board within sixty days (from the July 13, 1999, Board hearing) identifying all case narratives currently scheduled, programmed, or under analysis for potential investigation and recommend to the Board those investigations and activities that are candidates for discontinuation. (*Interim Report*, Chapter 1)
- The Board recommends that the *MITRE Report*[1] regarding intelligence collection and analysis during the Gulf War be issued in an unclassified form. (*Interim Report*, Chapter 2)
- The Board recommends that OSAGWI should clearly demonstrate how it digests and evaluates the information it amasses to reach the conclusions presented in its reports. (*Interim Report*, Chapter

4)

- The Board recommends that OSAGWI should develop a policy for determining when and by what criteria interim reports should become final. (*Interim Report*, Chapter 4)
- The Board recommends that OSAGWI include in the rewrite of its DU environmental exposure report the exposure parameters (such as quantity of DU, duration of exposure) for the thirteen exposure scenarios (presented in Table 1, page 8) to establish that Level I scenarios represent the highest exposure levels. (*Interim Report*, Chapter 4)
- The Board recommends that OSAGWI extend the external review of its environmental exposure reports to other appropriate agencies and subject matter experts. (*Interim Report*, Chapter 4)
- The Board recommends that in assessing the likelihood of the presence of chemical or biological agents OSAGWI should present in its reports the evidence, its expert opinion, and the assumptions it used to weigh the pieces of evidence in reaching its conclusions. (*Interim Report*, Chapter 4)
- The Board recommends that the Department of Defense continue to review new information and modeling results, and take action as necessary and appropriate. (*Interim Report*, Chapter 5)

The Board believes that the other four recommendations no longer apply due to policy changes and other factors:

- The Board recommends that the Assistant Secretary (C^3I) respond to this recommendation [adding a position location capability to the Personal Information Carrier] and report to the Secretary of Defense and the Board, within thirty days of this report, as to the progress on this matter as reported by the Chairman of the Joint Chiefs of Staff. (*Interim Report*, Chapter 1)
- The Board recommends that OSAGWI cease work on all information papers except those due to be released within sixty days of the publication of this report. (*Interim Report*, Chapter 3)
- The Board recommends that any continuation of the "lessons learned" activity at OSAGWI be supported by a plan, approved and directed by the Secretary of Defense, that addresses and recognizes the formal integration of the OSAGWI lessons learned team into the existing Military Service and Joint Staff lessons learned infrastructure. (*Interim Report*, Chapter 3)
- The Board recommends that the Secretary of Defense obtain a formal commitment from the Secretary of Veterans Affairs for routine participation and representation by VA in support of OSAGWI's outreach and town hall meetings. (*Interim Report*, Chapter 3)

This report, entitled *Iraqi Chemical Warfare: Analysis of Information Available to DoD,* is also known as the *Mitre Report.* The report was commissioned by the Office of the Assistant to the Secretary of Defense for Intelligence Oversight.

Chapter 1

MISSION, CHARTER, AND ACTIVITIES

Mission and Charter

President William J. Clinton established the Special Oversight Board by Executive Order 13075 of February 19, 1998, in direct response to a recommendation contained in the Presidential Advisory Committee (PAC) on Gulf War Veterans' Illnesses *Special Report.* The PAC recommended that the Department of Defense (DoD) receive an independent evaluation of its policies and practices and that "to ensure full public accountability and reinforce the commitment to an independent review, an entity other than DoD should perform any oversight." The President appointed the Board of seven members under the chairmanship of former United States Senator Warren B. Rudman. The Board's charter was filed in May of 1998.

The Board conducted its activities in accordance with the Federal Advisory Committee Act (FACA), as amended (Public Law 92-463, 5 U.S.C., App.); Executive Order 12024, December 1, 1977; and Public Law 94-409, commonly referred to as the "Government in the Sunshine Act." All Board meetings must be announced in the Federal Register whenever a quorum of members is expected, and they are always open to the public except during the discussion or review of classified material.

Executive Order 13075 (Appendix B) specifies the Board's mission, and it states, in part:

> *Sec.2(c). The Special Oversight Board shall provide advice and recommendations based on its review of Department of Defense investigations into possible detections of, and exposures to, chemical or biological weapons agents and environmental and other factors that may have contributed to Gulf War illnesses.*
>
> *Sec.2(d). It shall not be a function of the Board to conduct scientific research.*

The Board's charter (Appendix C) outlined more specifically how the Board intended to conduct its mission:

> *The Special Oversight Board shall provide to the President, through the Secretary of Defense, advice and recommendations based on its performance of two principal roles.*
>
> *1. OVERSIGHT: Independent oversight of the remaining investigations being conducted by the Department of Defense (DoD) with the assistance, as appropriate, of other executive departments and agencies into possible detections of, and exposures to, chemical or biological warfare agents and environmental and other factors that may have contributed to Gulf War Illnesses.*
>
> *2. EVALUATION: Overall evaluation of the DoD's plan for and progress toward the implementation of the Presidential Advisory Committee's recommendations contained in its Special Report submitted to the President on October 31, 1997.*

To comply with the executive order and the charter, the Board focus has been on the DoD investigations into Gulf War illnesses and implementation of the PAC recommendations. The bulk of our efforts have

concentrated on the work of the Office of the Special Assistant for Gulf War Illnesses (OSAGWI), the organization charged by the Deputy Secretary of Defense to lead and provide overall coordination for the Department's effort on this issue. The Board has actively solicited the views and opinions of veterans groups, individual veterans, physician health care providers, and basic and applied scientists and researchers on the issue of Gulf War illnesses.

Board Public Meetings

The Board members met for the first time in July 1998 and received a detailed briefing from the DoD on the history and background of the Gulf War illnesses issue. No deliberations were conducted at this session. The Board has held eight public meetings throughout the United States in order to reach as many as possible of the veterans who have an interest in our oversight efforts. The Board held four public sessions prior to the release of the August 1999 *Interim Report*, and there have been four additional public meetings since the *Interim Report*:

Washington, DC	November 1998
San Antonio, Texas	April 1999
Arlington, Virginia	June 1999
Washington, DC	July 1999
Arlington, Virginia	September 1999
Fort Lewis, Washington	October 1999
Washington, DC	April 2000
Arlington, Virginia	October 2000

Complete transcripts from these hearings can be found at the Board's World Wide Web home page at: www.oversight.ncr.gov. The Board established this web site to ensure compliance with the spirit and letter of the FACA and the complete openness and public nature of its efforts.

At the initial November 1998 hearing, the Chairman outlined in detail how the Board would conduct oversight. The Board heard testimony from senior DoD officials, OSAGWI, the Joint Staff, and the Office of the Assistant Secretary of Defense for Health Affairs (ASD-HA). The Board, equally eager to receive testimony from the veterans community, invited major veteran service organizations (VSO) and individual veterans to testify. The Board also solicited input from and listened to testimony from interested non-veteran citizens. A major theme emerged during the two-day hearing: veterans want medical care, medical treatment, and award of benefits for service-connected disabilities.

The Board met in San Antonio, Texas, in April 1999 to ensure that it was available to receive input from those individuals unable to address the Board in Washington, DC. Two major VSOs, several individual veterans, and a committed Gulf War illness investigator testified before the Board. The featured presentation by Dr. Robert Haley, University of Texas Southwestern Medical Center, Division of Epidemiology and Scientific Graphics Laboratory, delineated the technical aspects of his neurological research and his perceived clinical implications for affected patients. The Board also provided the public

a general overview of its activities since the November 1998 public meeting.

As a follow-up to the San Antonio meeting, the Board invited Dr. Haley to provide additional testimony in Arlington, Virginia, in June 1999. The Board meeting was open to the public, and subject matter expert scientists were invited from the Johns Hopkins University and Boston University Medical Schools and the Department of Veterans Affairs (VA) Medical Center, Boston, Massachusetts. These scientists were asked to assess Dr. Haley's presentation and advise the Board on the validity of the data and it's clinical importance. The Board believes that Dr. Haley's findings are of interest and require independent replication.

At the July 1999 public hearing in Washington, DC, the Special Assistant for Gulf War Illnesses outlined to the Board a conceptual model for OSAGWI over a five-year period ending in Fiscal Year 2004. Two scientific researchers and an OSAGWI staff representative presented additional testimony about depleted uranium (DU). The Chairman noted that there continues to be controversy on DU, despite testimony and scientific opinion that low-level or short-term exposure(s) to this element offers relatively little risk to humans.

In addition, Admiral Zumwalt, citing previous experience with the U.S. Government concerning "Agent Orange," indicated that he did not think that there was, nor had there been, a "government cover-up" to suppress available information concerning the facts surrounding the Gulf War or chemical or biological exposures of U.S. or coalition troops.

A Central Intelligence Agency (CIA) representative testified that the agency planned to release three additional studies on the issue of potential chemical, biological, and radiological exposures to Gulf War veterans by the end of 1999.[1] The CIA tentatively concluded that U.S. troop exposures to chemical, biological, and radiological agents were limited to the potential low-level exposure from the Khamisiyah demolitions. The CIA will continue to seek and evaluate new information as it becomes available.

The Board met again in September 1999 in Arlington to review with OSAGWI the strategic direction of that organization as well as the status of remaining OSAGWI case narratives, information papers, and environmental exposure reports. The Board recommended that OSAGWI consider transitioning from an organization that conducts retrospective investigations to a more prospective agency that would ensure that the military services successfully apply the force health protection lessons learned in the Gulf and elsewhere. The new agency would also retain responsibility for interfacing with the public on Gulf War health issues. In response to a Board request, OSAGWI reviewed each of its remaining publications and recommended that several be terminated based on the lack of substantiating documentation or any meaningful contribution to our understanding of Gulf War illnesses. The Board concurred with all but two terminations, advising OSAGWI to complete its SCUD information paper and the case narrative on alleged chemical casualties in the 2nd Marine Reconnaissance Battalion.

The Board met in October 1999 at Madigan Army Medical Center, Fort Lewis, Washington, to reconfirm its commitment to receive input from individuals unable to address the Board in Washington, DC. Three major VSOs and several veterans testified. Two medical researchers presented the results of their investigations into Gulf War illnesses, and a representative from the United States Transuranium and Uranium Registries discussed the medical effects of depleted uranium. The Board also provided a general overview of its activities to date.

The April 2000 public meeting was held in Washington, DC, and focused on an OSAGWI follow-on organization. Dr. Bernard Rostker, the Special Assistant for Gulf War Illnesses, presented a detailed

proposal to the Board, and representatives from the Joint Staff, other DoD agencies, and the VA commented positively on expected synergies with the proposed organization. Seven VSOs presented their views, and five VSOs concurred with the design of the proposed follow-on organization. Two VSOs requested that the National Institutes of Health lead Gulf War illnesses medical research efforts. Featured presentations included the results of the Canadian Board of Inquiry of illnesses of Canadian troops in Croatia, Department of Defense status reports on its new low-level chemical warfare agent defense efforts, and the interagency Research Working Group review of the continuing research on pyridostigmine bromide (PB) and low-level chemical warfare agent exposures. The General Accounting Office (GAO) declined an opportunity to discuss its report *Gulf War Illnesses: Management Actions Needed to Answer Basic Research Questions* (GAO/NSIAD-00-32) and offered only to answer specific questions rather than present at a subsequent monthly meeting.

The Board conducted its final public meeting in Arlington in October 2000. The hearing focused on the transition of the newly formed Office of the Special Assistant for Gulf War Illnesses, Medical Readiness, and Military Deployments (OSAGWIMRMD). Dr. Rostker detailed efforts to complete the remaining investigations of alleged chemical and biological incidents, several of which will be finished in 2001. He remarked on efforts to refocus certain elements of the staff toward medical readiness and military deployment issues while continuing to provide effective interface with the public on Gulf War illnesses. The Board also received briefings on the Millennium Cohort Study and a Gulf War research initiative.

Monthly Meetings

At the first public meeting in November 1998 the Chairman proposed that the Board hold monthly informational meetings on a wide range of topics. These meetings provide a forum for invited subject matter experts, knowledgeable organizations, and interested individuals to meet with Board members to explore issues of concern. Invited participants have included government officials, researchers, and veterans' representatives. The Board extended an open invitation to VSOs to attend these sessions. Topics covered have included depleted uranium, PAC recommendations, the DoD Force Health Protection program, and Personal Information Carrier (PIC)/Global Positioning System integration. The Board offered repeatedly, without success, to meet with Dr. Pamela Asa and Dr. Robert Garry to discuss their work on squalene.

These meetings focused on specific areas of interest to the Board, Board staff, and the "Gulf War illness" community. They promoted a free exchange of ideas and discussion on controversial topics and encouraged both debate and in-depth understanding of technically complex and detailed issues. A detailed description of these sessions is contained in
Appendix H.

Other Noteworthy Board Activity

Board members have made field visits to the United Kingdom and French Ministries of Defence, the French Chemical School, the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM), and nine OSAGWI "town hall" meetings held at various military installations in the United States and overseas. The Board also participated in several National Security Council interagency working group meetings where the agenda was focused exclusively on matters pertaining to the subject of Gulf War illnesses and the application of the Gulf War experiences and lessons learned to ongoing U.S. military force health and protection issues.

Board Review of OSAGWI Publications

A primary focus of the Board has been review of OSAGWI case narratives and environmental exposure reports. OSAGWI's reports are written to provide veterans with answers regarding what is now known about specific events and exposures that took place during the Gulf War. As of November 30, 2000, the Board had reviewed 14 case narratives, 3 environmental exposure reports, and 11 revised narratives/reports. Detailed reports of the Board's findings and recommendations concerning OSAGWI's case narratives and environmental exposure reports are contained in Chapters 3 and 4, respectively, of this report.

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[1] The CIA's Persian Gulf War Illness Task Force released two reports detailing possible sources of radioactive contamination and biological agents during the Gulf War in July and August 2000, respectively. The Task Force stated that no Gulf War releases of Iraqi-produced radioactive material would have reached coalition troops. This is not surprising, based on the status of Iraq's nuclear program, the location of Iraqi nuclear facilities far from coalition ground forces, and the localization of any contamination. The Task Force also concluded that no biological warfare agent was released as a result of Iraqi use, coalition bombing, or Iraqi unilateral postwar destruction.

Chapter 2

THE TRANSITION FROM OSAGWI TO OSAGWIMRMD

OSAGWI has been the focus of the Board's oversight of DoD investigations of chemical and biological incidents. This emphasis reflects the role of OSAGWI as the lead DoD agency for investigating potential chemical and biological exposures during Operations Desert Shield and Desert Storm (ODS) in addition to researching other possible causes of Gulf War illnesses.

The Deputy Secretary of Defense established OSAGWI on November 12, 1996, in the wake of DoD revelations that U.S. and coalition personnel may have been exposed to low-level nerve agents following the destruction of enemy ammunition stores at Khamisiyah, Iraq. In his November 1996 memorandum, the Deputy Secretary of Defense designated Dr. Bernard Rostker, then Assistant Secretary of the Navy for Manpower and Reserve Affairs, to become his Special Assistant and direct OSAGWI in addition to his existing responsibilities. The memorandum made Dr. Rostker "responsible for all of the Department's efforts regarding illnesses being experienced by those who served in the Gulf War," and OSAGWI assumed the mission of determining the causes of Gulf War illnesses, ensuring that veterans received proper care, and identifying and publicizing within the Defense community the many lessons learned from the Gulf War.

DoD provided OSAGWI with considerable resources to accomplish its mission. Initial plans provided for a 110-person organization, a nine-fold increase over the Persian Gulf Illnesses Investigation Team (PGIIT), OSAGWI's immediate predecessor within the Office of the Secretary of Defense (OSD). By Fiscal Year 1999, OSAGWI engaged 196 personnel, 26 of whom were government employees and the remainder contractors. The Special Assistant's allocation of assets within his organization clearly reflected OSAGWI's tripartite mission and its many responsibilities. Appropriately, the Investigations and Analysis Division (IAD), the largest subunit, was responsible for researching and analyzing all potential exposure incidents, environmental issues, and other factors that may have contributed to Gulf War illnesses. Resources for the other divisions appear to be appropriate to their missions and OSAGWI priorities.

OSAGWI has worked to describe and to explain in detail specific incidents of suspected chemical exposures as well as potential environmental hazards both during and after the Gulf War. The organization has released 17 case narratives, 4 environmental exposure reports, and 9 information papers. In addition, OSAGWI commissioned the RAND Corporation to conduct eight reviews of scientific literature pertaining to Gulf War illnesses, of which five have been released. These investigations and their contribution toward achieving this key OSAGWI mission enumerated in Deputy Secretary White's November 1996 memorandum will be discussed in the following two chapters.

OSAGWI has devoted considerable resources to ensure that Gulf War veterans receive adequate care. This effort incorporates activities of elements of IAD as well as the Public Affairs Branch, the Medical Outreach and Issues Team, and the Information Technology Team. The Board believes that OSAGWI has fully achieved its goal of assisting the veteran and that the organization has developed the template for success that other government agencies should use in the future.

Perhaps most noteworthy is OSAGWI's sustained effort to provide veterans and the public with as much information as possible through the Internet, a telephone hotline, and town hall meetings. In addition, OSAGWI has increasingly used VSOs and military service organizations (MSOs) to provide information

to Gulf War veterans.

OSAGWI's web site, GulfLINK, has provided the public, and especially the veterans community, with a valuable resource for furthering its understanding of Gulf War illnesses. The user-friendly site has received several awards and has been rated one of the best federal government web sites. GulfLINK averages more than 200,000 visitors per month and offers a wide array of information as well as hyperlinks to other web sites. Visitors can access speeches, all OSAGWI publications, and a host of other data. Of particular note is the hyperlinking of most source documents to the footnotes found in the case narratives and other official releases.

The toll-free hotline system also deserves mention. Operated by the Veterans Data Management Team (VDM), a branch of IAD, the hotline provides OSAGWI with the means to receive and react to leads and calls for assistance. Moreover, the hotline also provides OSAGWI with the ability to alert thousands of veterans to services in addition to locating witnesses for case narratives and other research initiatives.

The Public Affairs Office (PAO) has also contributed to the organization's increasing ability to inform the veterans community and others. The office has enabled OSAGWI to develop a closer rapport with VSOs and MSOs, a noteworthy achievement considering OSAGWI's initial missteps with these organizations. VSOs and MSOs regularly receive updates and briefings on OSAGWI activities and other GWI initiatives, such as the comprehensive therapy program offered at Walter Reed Army Medical Center (WRAMC). OSAGWI leadership also meets with VSO/MSO leadership counterparts, and OSAGWI now regularly sends information displays and veteran contact managers to major VSO and MSO national and regional conventions.

OSAGWI has conducted town hall meetings in thirteen metropolitan areas throughout the country and in overseas locations to discuss the results of its investigations as well as to learn and respond to veterans' concerns. The Special Assistant selected the sites based on his wise determination to reach as many veterans as possible. OSAGWI went to great efforts to publicize the meetings and to stimulate media interest. The meetings, in general, provided OSAGWI with additional sources of information and enhanced its credibility. In addition, PAO utilized editorial boards and other media coverage to increase public awareness of GWI issues.

Beginning in 1998, OSAGWI began an ongoing program to visit major military installations to increase its contact with active duty and reserve component forces. Depending on the installation's military population, OSAGWI conducted the visits over a two- or three-day period. Briefings were provided to Gulf War veterans, service members who deployed to the Persian Gulf after 1991, and other interested personnel. OSAGWI targeted leaders as well as junior personnel, and the briefings typically lasted one hour, followed by a question and answer period. Board and staff members have observed several of these installation visits, and OSAGWI incorporated Board comments in an ongoing effort to optimize the effectiveness of its presentations.

Medical personnel received customized briefings to enhance their sensitivity to the special nature of Gulf War illnesses. In addition, OSAGWI conducted evening town hall meetings to encourage attendance of spouses and other veterans. These meetings featured a question-and-answer format in which the audience could present questions directly or submit written questions for the moderator to present. VA representatives often attend the town hall meetings to respond to questions regarding benefits and clinical care issues. Cumulative attendance at these installation visits has exceeded 3,000 attendees, many of whom requested various OSAGWI publications.

The Lessons Learned Implementation Division (LLID) has the responsibility of "institutionalizing

validated observations/findings" and ensuring that they are implemented. The LLID has taken the lead in facilitating service-wide implementation of DU training. The division has chaired several joint service meetings, and LLID is making great strides in updating DU training. In June 2000, the LLID conducted an in-depth conference on stress that has catalyzed DoD efforts on this important, yet often misunderstood, subject.

The LLID has also reviewed OSAGWI case narratives and environmental exposure reports to identify lessons learned and then to disseminate those lessons throughout the Defense community. The Board had stated misgivings in its *Interim Report* about such efforts being a form of mission creep because other DoD agencies have responsibility for implementing lessons learned. However, the Board has since determined that the LLID represents a promising means of ensuring that our forces can leverage the lessons that can be gleaned from the Gulf War and future military deployments.

New Directions

The Board informed DoD in a September 1999 meeting that OSAGWI needed to expand its focus from strictly Gulf War issues to the development of a "future oriented" organization that would also address the multiple aspects of military operations before, during, and after a deployment. In particular, the Board stated that the emphasis on retrospective investigations did not best serve present and future veterans.

At the September 1999 meeting, the Board received and approved OSAGWI recommendations to discontinue certain retrospective investigations and environmental exposure reports that would not have contributed to a better understanding of Gulf War health problems. The November 1999 Special Oversight Board *Special Report* summarizes these recommendations (Appendix I). The Board also requested that the Department begin to transition OSAGWI from the "retrospective" investigative organization to one that will focus on the multiple aspects of "deployment" of our military forces, "anticipate" the needs of future deployments, and enhance DoD's many ongoing initiatives to optimize force health protection.

Dr. Rostker charged OSAGWI with developing a concept for a permanent organization that would still lead DoD's Gulf War illnesses effort while also protecting the health of the armed forces. Following lengthy coordination throughout the Department and with many veteran organizations, Dr. Rostker presented his proposed organization to the Board at its April 2000 public meeting. The Board concurred with his concept, as did the major veterans groups that also testified at that session.

The Secretary of Defense announced the new position of Special Assistant to the Secretary of Defense for Military Deployments on July 26, 2000. After consultation with National Security Council (NSC) staff, the position title was modified (to include the organization's new missions and functions) to the Special Assistant to the Secretary of Defense for Gulf War Illnesses, Medical Readiness, and Military Deployments (OSAGWIMRMD).

The Board believes that the Department, OSAGWI, and the military services have made significant contributions to:

- understanding the nature of events that took place in the Gulf that many have interpreted as having a consequential relationship to veteran ill health;
- recruiting respected individuals and organizations to analyze and report on issues central to the Gulf War illness issue;
- presenting reports to the American public on the circumstances of events that occurred, were

reported to have but never did occur, or occurred at a different place or time during the Gulf War;
- furthering Gulf War illness basic and applied medical and scientific research;
- achieving significant improvement in departmental awareness, appreciation, and understanding of service member and veteran health matters;
- addressing military dependent health matters;
- recognizing the interrelationship(s) of military members, military deployment, in-theater events, military and dependent health, veteran transition to civilian life, and veteran health matters and how these matters are simultaneously independent and related to each other and can have dramatic influence on public opinion and the public's perception of its government's conduct;
- restoring trust and fostering improved dialogue and relationships with the American veteran community;
- preparing for future deployments of our military service members; and
- fulfilling the President's directive(s) to "leave no stone unturned" to uncover (if possible) the reason that our Gulf War veterans were (are) ill.

It is also the opinion of this Board that DoD and VA have met the spirit of the PAC recommendations to search for the cause(s) of Gulf War illnesses.

Another PAC *Special Report* recommendation stated that "DoD, VA, and DHHS should complete the comprehensive risk communication program for Gulf War veterans, as well as for forces deployed in the future; community-based outreach should receive particular focus."

In response to this PAC recommendation on risk communication and outreach, DoD (OSAGWI and its successor, OSAGWIMRMD) conducted multiple town hall meetings as well as military installation visits, both in the continental United States and overseas. Board members attended several of these outreach sessions. As a general observation, most of the audience issues at these DoD outreach town hall meetings centered on VA medical care, medical benefits, and general health and specific illnesses of either veterans and or family members.

The Board commends OSAGWIMRMD for its conduct of these town hall sessions and the positive approach taken by the DoD in situations that were in some cases openly hostile. However, attendance has been declining at the town hall meetings that have been the centerpieces of recent installation visits. Moreover, attendees have focused not on DoD areas of concern but on the quality of VA treatment and compensation. The leadership of the new OSAGWIMRMD has indicated it will most likely suspend further installation visits until it can develop a more effective alternative, and the Board agrees. However, the Board also believes that periodic meetings with veterans, in addition to maintaining an informative worldwide web site, 1-800 toll-free operators, and other existing outreach initiatives, must be continued. The VA should assume the lead for Gulf War illness-focused town hall meetings because veteran questions have centered on that department's services. OSAGWIMRMD should assume a supporting role in such meetings, and the Military and Veterans Health Coordinating Board (MVHCB) should facilitate the transfer of responsibility from DoD to VA for Gulf War illness-focused town hall meetings. OSAGWIMRMD should use those meetings to inform the public about its new responsibilities and use DoD news media, installation visits, and other initiatives to ensure that the active and reserve components of each military service also understand the organization's enhanced mission.

Chapter 3

OSAGWI CASE NARRATIVES

As of October 31, 2000, the Board had reviewed fourteen original case narratives and nine revised case narratives that OSAGWI and its follow-on, OSAGWIMRMD, have released (see Appendix F). The primary purpose of the case narratives is to provide a summary of events surrounding a possible or reported nuclear, biological, chemical (NBC) attack/exposure and to assess how likely it is that the attack/exposure actually occurred. The Board did not review information papers because they do not address potential exposures and are intended to provide a nontechnical summary of issues or equipment closely associated with OSAGWI investigations.

Methodology

The Board noted in its *Interim Report* that OSAGWI did not reach its case narrative assessments based on its stated standard. Instead, OSAGWI employed a preponderance of evidence approach. Although the Board did not disagree with this approach, the Board believed that OSAGWI should have clearly specified in its reports what evidence carried the greatest weight and why certain other evidence could be dismissed or discounted.

OSAGWI subsequently modified its stated methodology in both Section I and Tab D of each case narrative to conform to actual practice. The Board believes that the revised methodology fully reflects OSAGWI procedures and, more important, provides the most accurate method for assessing whether chemical warfare agent exposures may have occurred in the Gulf.

Disposition

The Board recommended in the *Interim Report* that OSAGWI develop a policy for determining when and by what criteria interim reports would become final. OSAGWI and the Board have since agreed that reports will be finalized once the Board determines that the case narrative contains a sufficient explanation of the incident(s), accounts for contrary evidence, and does not require additional investigation. The Board bases its determinations on internationally accepted protocols and guidelines and the reasonable man concept used in the U.S. legal system.

OSAGWI REPORTS REVIEWED BY THE BOARD

The Board found that in all of its case narratives, OSAGWI made assessments regarding the presence of chemical and biological warfare agents that were consistent with available evidence. In the one interim case narrative, the Kuwaiti Girls' School, the Board concurred with the assessment that chemical warfare agent was definitely not present in a storage tank but disagreed that the liquid therein was definitely inhibited red fuming nitric acid. The Board noted shortcomings that did not affect the quality of the assessments in only four interim case narratives: Al Jaber Air Base, Czech/French Detections, Fox Detections in an ASP/Orchard, and Reported Mustard Agent Exposure I.

11th Marines

Case Narrative: 11th Marines, October 30, 1998. This report addresses eighteen incidents that occurred in the area of operations of the 11th Marines, an artillery regiment assigned to 1st Marine Division, during the air and ground campaigns. The incidents generally consisted of unit alerts followed by chemical testing and/or unmasking procedures that did not confirm the presence of chemical warfare agents (CWA). OSAGWI assessed the possibility of CWA being present during any of the incidents as being "unlikely."

The Board found each of OSAGWI's eighteen assessments that it was "unlikely" that CWA was present to be consistent with the available evidence.

The Board recommended that OSAGWI revise the original case narrative to explain more fully several incidents, to ensure the accuracy of all references, and to correct minor editorial oversights prior to releasing it as a final report.

Al Jaber Air Base

Case Narrative: Al Jaber Air Base, September 22, 1997. This report addresses six alleged detections of chemical warfare agents in the 1st Marine Division during ground operations against Iraqi units near Al Jaber Air Base, Kuwait. Marine units encircled Al Jaber Air Base on the night of February 24-25, 1991. On five occasions marines near the division forward command post received oral "gas alerts." No unit reported any alerts, and M256 detector kit tests all proved negative. On February 25 a Fox crew reported detecting a lethal concentration of mustard agent, a qualitative capability that the vehicle does not possess. The 1st Marine Division NBC section reviewed the tape and considered it a false alarm. No marines reported injuries consistent with mustard exposure, and no artillery or air attacks could be associated with the alleged detection. An inspection of Iraqi ammunition abandoned at Al Jaber revealed no CWA munitions. OSAGWI assessed the possibility of CWA being present during any of the incidents as being "unlikely."

The Board found each of OSAGWI's six assessments that it was "unlikely" that CWA was present to be consistent with the available evidence.

The Board recommended that OSAGWI revise the original case narrative to explain more fully several incidents, to ensure the accuracy of all references, and to correct minor editorial oversights prior to releasing it as a final report.

An Nasiriyah I, II, and III

Case Narrative: An Nasiriyah Southwest Ammunition Storage Point, July 30, 1998; revised and reissued on January 13, 2000; further revised and reissued on September 28, 2000. This case narrative addresses the possible presence of chemical warfare agents, chemical weapons (CW), and biological weapons (BW) at the An Nasiriyah Southwest Ammunition Storage Point in Iraq. U.S. precision-guided munitions struck the ammunition supply point (ASP) during the air war, and U.S. troops occupied the site following the cease-fire to destroy all remaining ammunition. Units found no chemical weapons, no biological weapons, and no contamination during the occupation and demolition operations. OSAGWI assessed the presence of chemical weapons, biological weapons, or bulk chemical agents at the site during the U.S. occupation to be "unlikely."

The Board found the OSAGWI assessment to be consistent with available evidence.

The Board recommended that OSAGWI revise the original case narrative to ensure the accuracy of all references and reissue it as a final report. The revised version incorporated the Board's comments and updated the narrative to reflect improved methodology and new information. A third version addressed a Board comment that a possible dual-purpose bomb pictured in the case narrative was likely a conventional munition.

Camp Monterey I and II

Case Narrative: Reported Detection of Chemical Agent Camp Monterey, Kuwait, May 15, 1997; revised and reissued on January 13, 2000. This report addresses a post-Gulf War incident that occurred at a U.S. Army installation in Kuwait. On September 16, 1991, two soldiers became sick after spilling white powder from a small metal can. Explosive ordnance disposal (EOD) personnel identified the powder as CS, a riot control agent, and two Fox vehicles conducted full-spectrum testing that confirmed the EOD team's assessment. OSAGWI assessed the possibility of CWA being present at Camp Monterey as "definitely not."

The Board agreed with OSAGWI's conclusion that the complete spectrum analyses of the suspect agent by the Fox vehicles identified the compound in question as the riot control agent CS and not a CWA.

The Board recommended that OSAGWI reissue the case narrative as a final report after ensuring the accuracy of its quotations and references. The revised version incorporated the Board's comments and updated the narrative to reflect improved methodology and new information.

Cement Factory I and II

Case Narrative: The Cement Factory, April 15, 1999; revised and republished on September 28, 2000. This narrative addresses the possible presence of chemical warfare agents at a Kuwaiti cement factory that Iraqi military units had once occupied. A Fox vehicle conducted a reconnaissance and alarmed for CWA. A second Fox vehicle sent to the factory alarmed for an unknown substance. Subsequent analysis of the Fox tapes indicated that no CWA had been detected. Soil samples also tested negative, but improper sealing of the soil containers compromised the definitiveness of the evaluation. Other attempts to confirm the presence of CWA at the factory proved negative. OSAGWI assessed the presence of CWA at the Cement Factory as "unlikely."

The Board found the OSAGWI assessment that it was "unlikely" that CWA was present to be consistent with the available evidence.

The Board recommended that OSAGWI revise the original case narrative to correct minor editorial oversights and reissue it as a final report. The revised version incorporated the Board's comments and updated the narrative to reflect improved methodology and new information.

Czech-French Chemical Agent Detections

Case Narrative: Czech and French Reports of Possible Chemical Agent Detections, July 29, 1998. This case narrative addresses reports by Czech and French units of seven detections or incidents (numbered 1 through 7) of nerve or blister agents in northern Saudi Arabia during the air campaign in late January 1991. No individuals reported any symptoms consistent with the two CWAs, and the detections cannot be related to attacks on Iraqi chemical sites. Since little information existed to prove or disprove five of the incidents, OSAGWI assessed those detections as "indeterminate" for the presence of nerve or blister agents. OSAGWI did not use its own criteria to assess the remaining two incidents (No. 1: the presence

of nerve agent; and No. 6: the presence of blister agent). Instead, it concurred with CIA and Defense Intelligence Agency assessments that the two detections were valid and credible.

The Board withheld its recommendation concerning the final disposition of the case narrative to permit OSAGWI to evaluate chemical detection incidents 1 and 6 using its own assessment scale. The Board also found that OSAGWI did not submit for external review changes to its assessments of incidents 2, 3, 4, 5, and 7. However, the Board found that the published assessments of those five incidents are consistent with available evidence.

The French Minister of Defense informed the Secretary of Defense in a June 3, 1999, letter that French units "had no positive results" and "only false alarms occurred, without positive confirmations." In addition, the Czech Ministry of Defense reevaluated incidents where Czech units had reported and confirmed as positive only the detections associated with incident 6 (the contaminated sand; an incident that could only have occurred by liquid mustard agent being poured or spilled on the ground).

OSAGWIMRMD is completing a revised report that will address Board concerns and new information.

Fox Alerts in the 24th Infantry Division I and II

Case Narrative: Fox Alerts in the 24th Infantry Division, February 22, 2000; revised and republished on October 26, 2000. This case narrative addresses a number of Fox vehicle tapes that showed alerts for the presence of chemical warfare agents during the period February 1 through 27, 1991. A Gulf War veteran provided these tapes to the Persian Gulf Illnesses Investigation Team and the Presidential Advisory Committee because he felt that the tapes presented clear evidence that his Fox vehicle had encountered chemical warfare agents. Mass spectroscopy experts analyzed the tapes and determined that the tapes did not indicate the presence of CWA. OSAGWI assessed the likelihood of any CWA being detected as "unlikely."

The Board found that OSAGWI'S assessment of "unlikely" is consistent with available evidence and recommended that the case narrative be reissued as a final report.

The Board recommended that OSAGWI revise the original case narrative to explain how the Fox operator obtained false relative intensity values on one tape and reissue the narrative as a final report. The revised version incorporated the Board's comments and updated the narrative to reflect improved methodology and new information.

Fox Detections in an ASP/Orchard

Case Narrative: Fox Detections in an ASP/Orchard, September 25, 1997. This report addresses the possible presence of chemical warfare agents at an ammunition supply point in Kuwait that U.S. forces occupied at the end of the ground war. A Marine Corps task force directed its Fox vehicle to inspect the ASP for potential chemical weapons and chemical warfare agents. The Fox alerted for three agents within 100 meters of one another during its February 28, 1991, inspection. Of the three agents (two blister agents-HD and HT-and benzyl bromide, a tearing agent), the Iraqis are known to have possessed only HD. The Fox crew attempted unsuccessfully to reconfirm the HD detection during their reconnaissance even though that chemical warfare agent is persistent. The task force NBC officer conducted a dismounted reconnaissance later that day using chemical agent monitors (CAM) but detected no CWAs. An EOD team inspected the ASP on March 1, 1991, and found no chemical weapons or CWA. At no time during the occupation of the supply point did any task force personnel

report symptoms consistent with any of the three chemical agents. After the war, the U.S. contractor responsible for dismantling the ASP found no chemical weapons. OSAGWI assessed the likelihood of CWA being present as "unlikely."

The Board found that OSAGWI's assessment that it is "unlikely" that chemical weapons or chemical warfare agents were present at the ASP during the U.S. occupation in 1991 is consistent with available evidence.

The Board recommended that OSAGWI should consider the investigation complete and change the interim case narrative to read "Final."

Injured Marine

Case Narrative: Possible Chemical Warfare Agent Incident Involving a United States Marine, March 16, 2000. This report addresses the possibility that testing of captured Iraqi personal equipment exposed a marine to Lewisite, a blister agent. Following the cease-fire, a marine tested Iraqi equipment with his Fox vehicle and then decontaminated himself with bleach and later with a chemically treated swab from his M258 skin decontamination kit. The marine developed skin blisters shortly thereafter and received medical treatment both in theater and upon his return to the United States. The blisters eventually healed after six months. Based on medical opinion, the lack of other casualties, no unit alerts, and the absence of Lewisite from the Iraqi inventory, OSAGWI assessed the possibility of the marine being exposed to a blister or other chemical warfare agent as "unlikely."

The Board found that OSAGWI's assessment that the marine was "unlikely" to have been exposed to chemical warfare agents is consistent with available evidence.

The Board recommended that OSAGWI should consider the investigation complete and change the interim case narrative to read "Final."

Kuwaiti Girls' School

Case Narrative: Kuwaiti Girls' School, March 11, 1998. This report addresses the liquid contents of a storage tank that was discovered next to an outside wall of a school building in Kuwait City, Kuwait, in early August 1991. EOD personnel examined a tank that was emitting a red vapor jet and had positive test results for the CAM and M18A2 chemical agent detector kit. A joint U.S.-United Kingdom team obtained liquid samples for on-site Fox testing and for laboratory analysis in the United Kingdom (UK). The full-spectrum analyses of the two Fox vehicles did not detect any chemical warfare agent, and the British laboratory at Porton Down confirmed the absence of any CWA and determined that the properties of the liquid were consistent with nitric acid. Inhibited red fuming nitric acid (IRFNA), a variant of nitric acid, is the oxidizer portion of the fuel for the Silkworm missiles found at the Kuwaiti Girls' School. OSAGWI assessed the tank's content as "definitely not" CWA and "definitely" IRFNA.

The Board initially found that OSAGWI's assessments were consistent with the best available evidence that chemical warfare agent was "definitely not" present at the Kuwaiti Girls' School and that the storage tank in question "definitely" contained IRFNA. The Board recommended that OSAGWI should consider this investigation complete and that the interim report should be changed to read "Final Report."

Subsequently, the Board discovered, while preparing to review the anticipated final report, additional information that cast some doubt on whether the liquid actually was IRFNA and also suggested that other Fox tapes existed. The Board and OSAGWI closely examined and researched these issues and

reconfirmed that the liquid in the tank was "definitely not" CWA. The limitations of retrospective investigations prevented the Board and OSAGWI from definitively determining the liquid's identity, although it was likely a nitrogen-based acid. OSAGWI is revising the narrative to incorporate the newly acquired information.

Possible Chemical Agent on a SCUD Missile Sample I and II

Case Narrative: Possible Chemical Agent on SCUD Missile Sample, August 13, 1997; revised and reissued on July 27, 2000. This case narrative addresses the possible presence of a chemical warfare agent on a metal fragment purported to be from a SCUD missile. The PAC received the fragment during a meeting in Charlotte, North Carolina. An unidentified individual had obtained the metal from a soldier who claimed it came from a SCUD that a PATRIOT missile had hit over King Fahd Military Airport on January 19, 1991. The U.S. Army Edgewood Research and Development Engineering Center tested the fragment and found no chemical warfare agents. The Missile and Space Intelligence Center determined that the metallurgical qualities of the fragment were consistent with those of a SCUD missile. Since an accurate chain of custody could not be established, OSAGWI assessed the presence of a CWA on the fragment to be "unlikely" (instead of "definitely not").

The Board agreed with OSAGWI's conclusion that it was "unlikely" that CWA could be found on the missile fragment to be consistent with available evidence.

The Board recommended that OSAGWI reissue the case narrative as a final report. OSAGWI updated the narrative to reflect improved methodology and new information.

Possible Mustard Release at Ukhaydir Ammunition Storage Depot

Case Narrative: Possible Chemical Agent Release at Ukhaydir Ammunition Storage Depot, June 16, 2000. This report addresses the possibility that during the air war U.S. troops may have been exposed to mustard agent released by coalition air strikes on the Ukhaydir Ammunition Storage Depot. Coalition forces struck the storage depot on January 20, 1991, and again on February 13 and 14, 1991. No evidence substantiates the release of chemical agent in the January air strike, and modeling indicates that any chemical agent that survived the fire would not have reached the most forward-based U.S. units. Available information cannot confirm that the February strikes resulted in a chemical release, but modeling demonstrated that any resulting CWA plume would not have reached any U.S. personnel. OSAGWI assessed the possibility of a chemical release from the January and February air strikes as "indeterminate" and the possibility that a release would have resulted in chemical agent exposures to U.S. troops as "unlikely."

The Board found both OSAGWI assessments to be consistent with available evidence and recommended that OSAGWI reissue the case narrative as a final report.

Reported Mustard Agent Exposure Operation Desert Storm I and II

Case Narrative: Reported Mustard Agent Exposure Operation Desert Storm, August 27, 1997; revised and reissued on October 26, 2000. This report addresses the possible postwar exposure of a U.S. Army soldier to mustard agent. PFC David Fisher developed blisters after exploring bunkers in northern Kuwait on March 1, 1991. Medics initially thought that spider bites had caused the blistering, but a senior medical officer diagnosed the blisters as resulting from exposure to mustard agent. OSAGWI

assessed this soldier's blisters as "likely" caused by a chemical warfare agent.

The Board agreed with OSAGWI's assessment even though much of the evidence presented in the case narrative was circumstantial. However, the Board notes that Col. Michael Dunn, a medical doctor and an expert in chemical warfare agents who commanded the U.S. Army Research Institute of Chemical Defense during Gulf War operations, diagnosed Private Fisher's blisters as having resulted from exposure to mustard agent.

The Board also found that OSAGWI did not fully research or investigate all possible evidence in connection with this incident. In particular, OSAGWI did not interview Colonel Dunn or obtain copies of the photographs that he took of Private Fisher's burns.

The Board notes that the investigation of this incident began before OSAGWI was established and that OSAGWI's investigation was primarily limited to reviewing available field correspondence and testimony. The Board also believes that OSAGWI's investigation process matured after this case narrative was published. The Board acknowledges that the General Accounting Office also found weaknesses in OSAGWI's investigation of this case and relayed its concerns to OSAGWI.

The Board recommended that OSAGWI update and amend the case narrative using the Board's findings and the GAO report (GAO/NSIAD-99-59) and reissue the report.

Several agencies have since identified additional information that materially changed the OSAGWI assessment. The only test of Private Fisher's urine for mustard agent breakdown products proved negative. Second, analysis of videotape taken during a Fox vehicle test of Private Fisher's flak jacket showed that the vehicle had false alarmed for mustard agent (the full-spectrum analysis did not support the presence of any CWA). Third, the diagnosing physician stated that he could not rule out the possibility that the blisters resulted from insect bites or some other irritant. Fourth, the recovered MM-1 printout tape from the coverall test did not indicate the presence of mustard agent. Based on this and other information, OSAGWI reassessed the likelihood that Private Fisher was exposed to mustard agent from "likely" to "indeterminate."

The Board found that OSAGWI's assessment of "indeterminate" that PFC Fisher was exposed to chemical warfare agents is consistent with available evidence.

The Board recommended that OSAGWI should consider the investigation complete and change the interim case narrative to read "Final."

Tallil Air Base, Iraq I and II

Case Narrative: Tallil Air Base, Iraq, October 30, 1997; revised and reissued on May 25, 2000. This case narrative addresses the possible presence of chemical weapons or chemical warfare agents at an air base that U.S. troops occupied in Iraq. U.S. aircraft had bombed the air base during Operation Desert Storm, and U.S. ground forces occupied the site following the cease-fire. During the occupation, U.S. troops discovered chemical warfare defensive gear but no chemical weapons or chemical warfare agents. OSAGWI assessed that the presence of CW and CWA at Tallil during the U.S. occupation was "unlikely."

The Board found that OSAGWI's assessment that it was "unlikely" that chemical weapons and chemical warfare agents were present at the air base during the U.S. occupation is consistent with available evidence.

The Board recommended that OSAGWI review the narrative to ensure its quotations and references were accurate and then reissue it as a final report. The revised version incorporated the Board's comments and updated the narrative to reflect improved methodology, new source documents, and an added lessons learned section.

U.S. Marine Corps Minefield Breaching II

Case Narrative: US Marine Corps Minefield Breaching, May 25, 2000. This report addresses the possible detection of chemical warfare agents when the 1st and 2nd Marine Divisions breached the forward Iraqi minefields on February 24, 1991. A Fox vehicle in each division reported detecting CWA in its one assigned breaching lane. In addition, the Fox crew in the 2nd Marine Division reported detections with a CAM and with M9 chemical detection paper later that day.

The Board found that OSAGWI's assessment that it is "unlikely" that U.S. forces were exposed to chemical warfare agents in each of the incidents is consistent with the best evidence available. The Board recommended that OSAGWI should consider the investigation complete and change the interim case narrative to read "Final."

The General Accounting Office reviewed the original version of this case narrative, dated July 29, 1997, and had expressed concerns with OSAGWI's assessment. The Board found that the current version fully addresses each of the GAO's concerns.

AWAITING PUBLICATION

2nd Marine Recon Battalion Injuries

11th Marines II

Al Jaber II

Al Jubayl II

Czech and French Reports of Possible Chemical Agent Detections II

Khamisiyah II

Kuwaiti Girls' School II

M-256 Detections at Rafha

Possible Chemical Agent Release at Muhammadiyat Ammunition Storage Site

The Gulf War Air Campaign - Al Muthanna

Chapter 4

OSAGWI ENVIRONMENTAL EXPOSURE REPORTS

Methodology

The Board noted in its *Interim Report* that OSAGWI described the contributions of organizations that helped OSAGWI collect and evaluate information, but OSAGWI did not explain the methodology it used in its environmental exposure reports. We recommended that OSAGWI should "clearly demonstrate how it evaluates the information it amasses to reach the conclusions presented in its environmental exposure reports."

OSAGWI has subsequently modified its stated methodology to include a purpose statement and a full discussion of its investigational framework. The Board believes that the revised statement of methodology fully reflects OSAGWI procedures and enhances the value of the exposure report to the reader.

OSAGWI ENVIRONMENTAL EXPOSURE REPORTS REVIEWED BY THE BOARD

The Board found that in each of its reports OSAGWI made assessments regarding environmental exposures that were consistent with available evidence.

CARC Paint I and II

Chemical Agent Resistant Coating (CARC), February 24, 2000; revised and republished on September 28, 2000. This report reviews vehicle-painting operations in the Persian Gulf during and following the Gulf War. U.S. troops and a few government employees painted thousands of military vehicles with desert tan CARC paint in theater during Operation Desert Shield to make them more difficult for the Iraqis to see and to help protect them from chemical warfare agents. Many of the same vehicles were painted olive drab again prior to retrograding them to assignments outside the Persian Gulf after the war. OSAGWI's environmental exposure report addresses the hazards that some CARC painters were exposed to during these operations and the health effects that some of them experienced. OSAGWI determined that only spray-painting operations posed a hazard to personnel and that only a very limited number of personnel participated in such operations (estimated 200 plus a smaller, unknown number of soldiers from small paint operations).

CARC contains several compounds that may cause short- and/or long-term problems for personnel involved in spray-painting operations who lack appropriate protective equipment. OSAGWI determined that the 325th Maintenance Company performed most of the spray-painting, with some U.S. Army civilian employees and the 900th Maintenance Company accounting for the remainder. The civilians had experience with CARC and brought protective equipment with them. They purchased additional equipment in Saudi Arabia for their paint operation and reported no adverse health effects. The 900th Maintenance Company assumed control of the civilian operation in February 1991, and its personnel also cited no ill effects from painting operations. The 325th Maintenance Company established two high-volume paint sites in December 1990. The unit had no experience in CARC painting and initially used inappropriate protective equipment, although the company eventually obtained proper respirators

and compressors. Since their return from Saudi Arabia, some members of the 325th Maintenance have reported adverse health effects. Privacy considerations prevent OSAGWI from examining medical and compensation records. However, some personnel have been diagnosed with respiratory conditions, such as asthma, that have been associated with CARC exposures (though in other populations asthma generally developed in workers who had been exposed for at least twelve months to several years).

The Board concurred with OSAGWI's characterization of potential CARC exposures as consistent with available evidence.

The Board recommended that OSAGWI consider its investigation complete, amend the report to explain more fully its many efforts to disseminate lessons learned to the military community, and then change the report title to read "Final."

DU Exposures

Environmental Exposure Report: Depleted Uranium in the Gulf, July 31, 1998. This report includes a primer on DU, describes DU exposures in the Persian Gulf, and provides a general discussion of the health consequences of such exposures. OSAGWI also describes ongoing DU research in this report. OSAGWI contracted with the RAND Corporation to provide medical information and relied on investigations by the Center for Health Promotion and Preventive Medicine (CHPPM) for estimates of radiation doses to exposed troops. OSAGWI determined that the RAND literature review and the CHPPM reports, data, and assessments, along with the more than fifty years of medical research on uranium, clearly do not support claims that DU has caused the undiagnosed illnesses that some Gulf War veterans are experiencing.

The Board found that OSAGWI's assessment is consistent with available information. The Board noted several minor shortcomings that do not affect that assessment. The Board recognizes that *Depleted Uranium in the Gulf* is an interim report and understands that OSAGWI will revise the report based on comments it receives as well as forthcoming research. Recommended changes include:

- OSAGWI should use as its "bottom-line" conclusion the more accurate statement on page 10:

  "Based on data developed to date, the Office of the Special Assistant believes that while DU can pose a chemical toxicity and radiological hazard under specific conditions, the available evidence does not support claims that DU caused or is causing the undiagnosed illnesses some Gulf War veterans are experiencing."

  instead of the more restrictive statement on page 44:
  "Exposures to DU's heavy metal (chemical) toxicity or low-level radiation are not a cause of the undiagnosed illnesses afflicting some Gulf War veterans."
  OSAGWI has agreed with the Board, and it will incorporate the change in its next DU report.

- The Board recommended that OSAGWI more fully discuss the levels of exposure of Gulf War veterans to DU and DU's toxicity to the kidneys. OSAGWI has concurred with these recommendations.
- The Board believes OSAGWI should have its DU report subjected to scientific peer review by non-DoD experts to ensure its availability to agencies that require that level of review. OSAGWI has since identified experts in the field, suggested by the Board, who will participate in the review of the next DU report.

- The Board recommended that OSAGWI fully discuss appropriate environmental standards of DU exposure (e.g., occupational radiation workers vs. general public exposures to radiation) for military personnel. OSAGWI agreed with the Board and will broaden its discussion of environmental standards in its next report.
- The Board indicated its intention to review the then newly released RAND Corporation report *A Review of the Scientific Literature As It Pertains to Gulf War Illnesses, Volume 7, Depleted Uranium* upon the release of OSAGWI's second DU report. The Board has since examined the RAND report and considers it to be an important contribution to the issue of DU and Gulf War illnesses. The report confirms OSAGWI's assessment that existing evidence does not support claims that DU has caused Gulf War illnesses.

The Board has continued to examine the issue of depleted uranium, and the Board still believes, after reviewing available evidence to date, that exposure to DU is unlikely to be the cause of the unexplained illnesses or diagnosed illnesses affecting Gulf War veterans.

Oil Well Fires I and II

Environmental Exposure Report: Oil Well Fires, October 13, 1998; revised and republished on September 28, 2000. This report compiled all available information that described burning oil wells in Kuwait during the Gulf War, the subsequent efforts to extinguish the fires, exposures to oil fire emissions, and possible health consequences to those exposures. OSAGWI relied on the 1998 RAND Corporation *Review of the Scientific Literature as It Pertains to Gulf War Illnesses, Volume 6, Oil Well Fires,* for parts of its discussion of health effects. OSAGWI relied on risk assessments conducted by CHPPM (formerly the U.S. Army Environmental Hygiene Agency [EHA]) to assess the possible consequences of exposures to oil well fire emissions.

During January and February 1991, Iraqi troops set over 600 Kuwaiti oil wells on fire. The EHA began collecting environmental samples (air and soil) in the theater of operations on May 3, 1991, and its successor, CHPPM, conducted a series of health risk assessments based on this data in the intervening years. The EHA draft interim report of June 19, 1992, included monitoring data through September 15, 1991, and the February 18, 1994, final report included data through December 3, 1991. In this final report, the EHA concluded, "the potential for significant long-term adverse health effects for the exposed (DoD) troop or civilian employee populations is minimal." However, the report also stated that levels of particulate matter "may have presented the potential for acute respiratory health effects in the very young, the very old, and in personnel with pre-existing airway disease." In addition, the EHA recognized very early two major limitations of its health risk assessment: air monitoring data were collected at only ten fixed sites (only half in or near Kuwait City); and EHA sampling did not begin until three and a half months after the first fires were ignited. Therefore, the health risk assessment was augmented with modeling to estimate exposures over the entire duration of burning oil well fires and over a greater area than is reasonably represented by the actual air monitoring data.

CHPPM released a draft "environmental surveillance health risk assessment" on June 29, 1998, that included troop unit locations in the calculation of exposure terms and a separate assessment based on modeled daily air concentrations for twelve substances in oil well fire emissions that were used to calculate risk numbers. The report concluded that "all troop unit excess cancer and non-cancer risk levels were below respective EPA safe risk levels. In other words, the environmental exposures troop units received from oil fires and other industrial sources in the Gulf region were not expected, by themselves, to cause health effects."

OSAGWI used these and other studies to write a report directed at veterans, policy makers, and other

non-scientists. OSAGWI cautioned the reader not to consider the report to be definitive and that further investigations needed to be completed before one could fully assess the long-term health effects of oil well fire exposures. However, OSAGWI correctly decided to provide veterans with the best information available in 1998 rather than have past and present service members wait several more years. Based on the results of the various studies, OSAGWI stated in its initial interim report that:

> *Collectively, the results of the health effects and risk assessment studies suggest that, with the exception of particulate matter, the concentrations of contaminants were at levels below those that are known to cause short- or long-term health effects. And therefore, except for the possibility that some pre-existing respiratory conditions may be exacerbated, one would not expect exposures to the levels of contaminants observed (other than particulate matter) to result in long term health affects* [sic].

The Board generally agreed with OSAGWI assessments. However, it noted that CHPPM calculated non-carcinogenic inhalation risk numbers for only three of the twelve substances modeled and did not include risks from inhalation of particulate matter, soot, sand, or raining oil. CHPPM and OSAGWI have worked closely with the Board since February 1999 to resolve the many Board questions and recommendations surrounding this complex environmental and human health and exposure issue. Although the Board initially expected greater scientific rigor in OSAGWI's follow-on report, the Board accepted that the intent of the OSAGWI report is to summarize extant information pertaining to oil well fires for all veterans and other interested members of the public who may not have technical or scientific training. OSAGWI agreed with the Board recommendation that the second interim report on oil well fires would clarify the objective of the report.

The OSAGWI *Environmental Exposure Report: Oil Well Fires II* integrated Board and other comments together with more recently completed research such as updated and finalized air monitoring and modeling information. The Board staff has favorably reviewed these reports and supporting information, especially the CHPPM oil well fire exposure analysis and health risk assessment data. In addition, OSAGWI expanded its methodology section to clarify fully the overall purpose of the report, provided fuller documentation, and enhanced the readability of the report. More important, OSAGWI correctly decided to discuss soot and other oil well fire-related particulate matter in a separate environmental exposure report that addresses all natural and man-made particulate matter. Accordingly, *Oil Well Fires II* focuses on the smoke that the burning oil well produced. The report, like its predecessor, determined that contaminant concentrations (less particulate matter) in the smoke were below those known to cause short- or long-term health effects and that, except for the possibility of exacerbating some pre-existing respiratory conditions, one would not expect exposures at the levels observed to result in long-term human health effects.

The Board found OSAGWI's assessment to be consistent with available evidence. However, additional research must be completed and assessed before OSAGWI can issue a final report. Ongoing efforts include CHPPM's investigation of "oil rain" exposures and revision of its risk assessment.

INSUFFICIENT TIME AVAILABLE FOR REVIEW

Particulate Matter

AWAITING PUBLICATION

Depleted Uranium II

Pesticides

Chapter 5

PRESIDENTIAL ADVISORY COMMITTEE *SPECIAL REPORT* RECOMMENDATIONS

The PAC *Special Report* contained twelve recommendations directed at several executive branch departments to enhance established programs dealing with Gulf War illnesses and certain Gulf War deployment issues.

The Board's charter calls for an "overall evaluation of the DoD's plan for and progress toward the implementation of the Presidential Advisory Committee's recommendations contained in its Special Report submitted to the President on October 31, 1997." The Board has used the monthly meeting "process" to receive updates from DoD and other executive branch agencies about the progress that has been made in implementing the twelve PAC recommendations (below in italics).

The Board finds that the Department of Defense appropriately implemented ten of the twelve recommendations contained in the PAC *Special Report* and was not required to act on the remaining two.

The Board considered the following recommendations in the Interim Report:

- *DoD and the Joint Chiefs of Staff, especially, should place a higher priority on addressing pre- and post-deployment surveillance. In particular, these entities should focus on ensuring field commanders are familiar with and implement thoroughly the medical surveillance directive. There is no way to compensate fully for our lack of good health assessment data of U.S. troops prior to and immediately after the Gulf War, but service members participating in future deployments and health care providers should not have to face the same inadequacies.*

Representatives from the Joint Staff and the ASD-HA briefed the Board on February 10, 1999, about DoD's progress in implementing the Deployment Health Surveillance and Readiness Program (DHSRP) specified in the Chairman, Joint Chiefs of Staff Memorandum MCM-251-98 of December 4, 1998. At a June 9, 1999, White House interagency working group meeting, the Assistant Secretary of Defense for Health Affairs noted that a recent spot inspection of some forward-deployed forces in the European theater suggested overall compliance with this program was running at about 60 percent.

The Board believes that the DHSRP addresses the PAC recommendation. However, the Board expressed concerns about two aspects of this program:

1. the program definition of "deployment," and
2. the use of Human Immunodeficiency Virus (HIV)/serum sample collections as the method for post-deployment serum sampling.

The DHSRP's definition of deployment fails to include any personnel deploying for less than thirty days, and it generally does not include personnel deployed aboard vessels. Reserve component personnel from all branches of service currently deploy overseas routinely in support of ongoing operations. Since many of these deployments last for less than thirty days, these personnel cannot benefit from the protections and health screening/information gathering efforts that this program stipulates.

Additionally, the program relies on the HIV screening program to be the primary source for sera used in the DHSRP. Under existing rules, HIV samples taken one year prior to and one year following a deployment would satisfy DHSRP requirements. The Board invited the Department to comment on this aspect of the DHSRP and invited recommendations on how the HIV sera sample component of the DHSRP can be improved to obtain sera samples in a more timely manner (e.g., draw sera just prior to and just after deployments).

The Board met with representatives from the Joint Staff on January 12, 2000, to obtain additional information on the DHSRP and the implementing Joint Staff memorandum, MCM-251-98. Based on this meeting and staff research, we feel that our previous concerns are being addressed appropriately.

The Joint Chiefs of Staff (JCS) representatives explained that virtually all active and reserve component personnel who deploy overseas for less than thirty days serve at locations that have permanent military medical treatment facilities (MTF). Areas with MTFs typically do not experience the environmental risk factors that can be encountered in areas where no such permanent facilities exist, and the MTFs can identify and treat personnel who do experience a wide range of adverse health outcomes. Similarly, shipboard deployments provide a somewhat controlled environment that differs little whether operating off the U.S. coast or that of a foreign nation. Moreover, deployments that include field operations ashore routinely occur in areas with permanent MTFs or established local health infrastructures.

The JCS representatives also explained the serum sampling protocol. DoD uses periodic HIV testing to provide the pre- and post-deployment samples on which retrospective investigations can be based. The military services do not take samples immediately after deployments because the bacteria and other antigens responsible for chronic problems will be present when the next HIV test is conducted. Additional samples would create additional costs without providing any corresponding value for force health protection or for potential research.

- *All research on Gulf War veterans' illnesses that is funded by the government should be subjected to external competition and independent peer review. Circumventing peer review of research proposals undercuts credibility. Respect for the peer review process is necessary to ensure that the highest quality science is funded; in this era of limited fiscal resources, it is even more critical that monies are marshaled wisely to fund the most meritorious proposals. If and when new funds can be identified as available for redirection to scientific and clinical research on Gulf War veterans' illnesses, such monies should be used to fund those projects identified as having been meritorious but that initially did not receive funding due to insufficient funds, or to fund projects via a new competition and peer review.*

A representative from the Persian Gulf Veterans Coordinating Board (PGVCB) briefed the Board on April 14, 1999, about progress made by the PGVCB in implementing this recommendation. He informed the Board that 99 percent of the extramural funded research had been awarded on a competitive, peer reviewed process.

The Board agrees with the PAC about the need for Gulf War illness research projects to be funded through a peer reviewed, competitive process. The Board believes that the PGVCB, working in conjunction with DoD, VA, and the Department of Health and Human Services (DHHS), has satisfied this recommendation.

- *The Secretary of Defense and the Joint Chiefs of Staff should move swiftly and conscientiously to address the past and current technological limitations of U.S. CW agent detectors, so that new products can afford U.S. troops an appropriate degree of protection. To specifically address the*

development of detectors for low-level, sub-clinical exposures to CW agents, DoD should establish a panel that includes experts from the private sector and other agencies, including the Environmental Protection Agency and the National Institute of Standards and Technology (NIST).

- *DoD should immediately begin developing doctrine that specifically addresses possible low-level, sub-clinical exposure to CW agents. Special consideration should be given to doctrine that establishes requirements for preventing, monitoring, recording, reporting, and assessing possible low-level CW agent exposure incidents.*

The Deputy Assistant to the Secretary of Defense for Chemical and Biological Defense briefed the Board on April 14, 1999, about progress made by the DoD in implementing these recommendations. The speaker described DoD efforts to address potential hazards from exposure to low levels of chemical warfare agents and chemical defense countermeasures. However, he did not brief the Board about the portion of the PAC recommendation advocating the establishment of a public/private panel of experts to develop detectors for low-level, sub-clinical exposures to CW agents. In its December 1997 response to the recommendation, DoD claimed that, because its current efforts include industry and government agency partnering, "... an additional panel ... is not needed at this time."

The Board believes that progress is being made by DoD in developing equipment to detect CW agents at low levels. Significant strides have been made since the Gulf War, both in the command emphasis devoted to the Chemical and Biological Defense Program (CBDP) and in the improvement of aspects of nuclear, biological, and chemical (NBC) detection equipment that were of debatable efficiency during the Gulf War. Multiple chemical alarms were noted during the Gulf War, yet the accuracy of those alarms remains the subject of debate to the present day. The CBDP can be credited with both developmental and research progress as well as progress in fielding equipment that received improvements after examination of its performance during the Gulf War.

The Board considered the remaining PAC recommendations for this *Final Report*:

- *DoD, DVA, and DHHS should complete the comprehensive risk communication program for Gulf War veterans, as well as for forces deployed in the future; community-based outreach should receive particular focus. In view of the delay from the originally projected completion date, this effort should receive heightened priority and be completed by January 1998.*

A representative from the PGVCB briefed the Board on October 29, 1999, about the risk communication plan that the Departments of Defense, Veterans Affairs, and Health and Human Services had developed and implemented for Gulf War veterans and for forces deployed in the future. The PGVCB representative described the comprehensive outreach activities that each department has been conducting since 1998.

The Board believes that the departments have created a viable and effective program that has not been uniformly implemented among all services; active, reserve, and National Guard components; veterans; families; veterans service organizations; and other constituencies. Community outreach efforts have contributed greatly to the effectiveness of the risk communication program. However, the tempo of ongoing efforts, particularly town hall meetings, should be consistent with actual needs and not conducted simply for their own sake.

The Board believes that DoD's risk communication program should increasingly focus on ongoing and future deployments. VA should assume the lead for continued risk communication efforts directed at Gulf War veterans, with DoD assuming a supporting role. The MVHCB should facilitate the transfer of Gulf War responsibilities between the two departments.

- *DVA and DoD should move promptly toward full implementation of the Committee's previous recommendations on medical and clinical issues – especially those focused on follow-up care and staffing matters at DVA facilities. DVA should incorporate Gulf War veterans into its case management system as rapidly as possible.*

An ASD-HA representative briefed the Board on October 29, 1999, about the progress in implementing previous recommendations concerning medical and clinical issues. He addressed the expanded research programs, improvements in medical deployment surveillance, increased force health protection, and the establishment of DoD Centers for Deployment Health. He also discussed the Department's efforts to establish Redeployment Clinical Practice Guidelines, a program designed to support service members and their families while enabling DoD to optimize force health protection on a continuing basis. He also described DoD's efforts to help the Military and Veterans Health Coordinating Board begin its operations.

The VA representative briefed the Board on its responses to the PAC's previous recommendations. He detailed how the VA has incorporated Gulf War veterans into its case management system and highlighted the July 1997 guidance from the VA Under Secretary for Health regarding that policy and the use of teleconferencing to disseminate techniques on "whole patient" care. He noted the implementation of health care provider training, evaluation, and certification programs that have helped to institutionalize the case management system. In addition, the Department has encouraged more innovative approaches to improving patient care by funding Gulf War Veterans' Illnesses Clinical Demonstration Projects. Five demonstration projects at selected VA medical centers have been funded, and the department will incorporate successful programs at all VA medical centers.

The Board believes that the efforts of the two departments have fulfilled the PAC's recommendations and, more important, demonstrate their commitment to meeting the health needs of Gulf War veterans.

- *DHHS should ensure that FDA places a high priority on resolving the issues raised by the Interim Final Rule on waiver of informed consent for the use of investigational products during military exigencies. Although FDA notes this matter raises several complex issues, the agency routinely handles many sensitive and difficult areas with due diligence and timeliness. FDA should finalize or revoke the Interim Final Rule no later than September 30, 1998.*

The DHHS representative briefed the Board on October 29, 1999, on this regulation. He noted that the Food and Drug Administration (FDA) had revoked its Interim Final Rule in response to the President's approval of Executive Order 13139 on September 30, 1999. The executive order is consistent with congressional legislation and permits only the President to waive informed consent rules. This action effectively resolves the PAC's concerns.

The FDA has since asked for public comment on a new Interim Final Rule that will enable the agency to establish criteria that the President will use to determine waiver approvals. In addition, the FDA asked for public comment on its Animal Efficacy Rule. This rule will establish guidelines for approving vaccines for human use when human testing would be unethical. The FDA is evaluating the responses to the proposed rules and hopes to finalize them soon.

- *DoD should seek an independent evaluation of policies and practices concerning the use of investigational products during deployments, as well as the concepts and practices of obtaining*

informed consent from U.S. troops and the role of troops as human research subjects, given the nature and structure of military service. Such assessments could be sought from the President's National Bioethics Advisory Commission.

A DoD representative detailed to the Board the steps that DoD has taken to respond to this PAC recommendation. He noted that the Department has established an interagency group consisting of DoD, FDA, NSC, and the Office of Management and Budget that will evaluate all aspects of investigational product usage and advise the President when such products are needed to ensure force health protection. The interagency group will consult with three non-federal representatives during its evaluation process. In addition, DoD is currently drafting a directive that will clearly enunciate and implement the procedures necessary for the Department to obtain independent assessments of investigational product requirements. Executive Order 13139 satisfies this recommendation.

- *Future investigations of possible chemical warfare agent exposures should adopt an objective standard against which all case investigations and all elements within a particular case – e.g., type(s) of detectors, eyewitness reports, secondary reference in an operational log, intelligence – are held to scrutiny. When evidence is indeterminate or ambiguous, the government's interpretation of, or decision-making related to, the element or investigation should weigh in favor of a presumption that ensures veterans' access to information and/or benefits.*

The Board culminated its review of DoD investigation methodologies with a January 12, 2000, meeting with the Office of the Special Assistant for Gulf War Illnesses. We believe that the methodologies currently used in OSAGWI case narratives and environmental exposure reports employ objective standards that must be used in future investigations. The narratives and reports incorporate investigation and validation processes used by the international community and the United Nation's Special Commission (UNSCOM) that inspected Iraqi facilities.

Standard procedures now consist of substantiating the incident followed by reviewing available data and documents, interviewing witnesses, and coordinating with external organizations and authorities, especially those with subject matter expertise. Because information from various sources may be contradictory, internal and external reviews seek to assess the evidence using the reasonable man concept, one of the judicial cornerstones of the U.S. legal system. In essence, analysts and reviewers must balance eyewitness accounts, hard sampling data, medical diagnoses, laboratory results, and subject matter expertise against one another and then select one of five conclusions based on the preponderance of evidence. The conclusions are: definitely, likely, indeterminate, unlikely, and definitely not.

- *The White House and DVA should work with Congress to establish a permanent, statutory program for Gulf War veterans' illnesses. The Committee envisions legislation that directs DVA to contract with an organization with the appropriate scientific expertise—e.g., the National Academy of Sciences—for a periodic review, for benefits and future research purposes, of the available scientific evidence regarding associations between illnesses and Gulf War service. The object of such an analysis would be to determine statistical associations between service in the Gulf War and morbidity and mortality, while also considering whether a plausible biological mechanism exists, whether research results are capable of replication and of clinical significance, and whether the data withstand peer review. Based on the external evaluation, the Secretary of Veterans Affairs would make a presumption of service connection for positive associations or publish reasons for not doing so. We believe specific details of such a program—e.g., risk factors exposure; the timing, length, and location of an individual's service; frequency of the scientific*

review—are best left to the department and legislators.

Legislation enacted on November 11, 1998, meets the spirit of this PAC recommendation. Section 101 of Public Law 105-368, the Veterans Programs Enhancement Act of 1998, requested that the VA contract with the National Academy of Sciences (NAS) "as an independent nonprofit scientific organization with appropriate expertise that is not a part of the Federal Government, to review and evaluate the available scientific evidence regarding associations between illness and service in the Persian Gulf War." The law stipulated that NAS conduct "a comprehensive review and evaluation of the available scientific and medical information regarding the health status of Gulf War veterans and the health consequences of exposures to risk factors during service in the Persian Gulf War" and specified that thirty agents, hazards, and medicines be evaluated.

Prior to the passage of this legislation, on October 31, 1997, the VA had officially requested that NAS, and its component Institute of Medicine (IOM), conduct such a review, and the two parties signed the contract on June 24, 1998. The IOM completed its review of the peer-reviewed literature for these initial four Gulf War health concerns—depleted uranium, sarin, pyridostigmine bromide, and vaccines—in August 2000, and the report was issued September 7, 2000. The Acting Secretary of Veterans Affairs has since determined that no service connection exists between these four factors and adverse health effects. The IOM will continue to examine other health concerns listed in the law in comparable peer-reviewed literature reviews.

The model for these reviews and evaluations is the ongoing IOM examination of Agent Orange. This model has proven to be effective in forming the basis for presumptive service connection for Vietnam veterans.

The Board determined that briefings were not required for the following PAC recommendations:

- *The White House should develop a plan to ensure Gulf War veterans and the public have access to and can be represented in the future deliberations about possible CBW agent exposures. To ensure full public accountability and reinforce the commitment to an independent review, an entity other than DoD should perform any oversight.*

The White House's response to this recommendation was to establish the Special Oversight Board. The Board is governed by the FACA, which requires public access to unclassified meetings and records.

- *DoD should identify all individuals within a 300-mile radius from the Khamisiyah pit and conduct an additional, complementary notification. In addition to the current effort, individuals who were in the Khamisiyah vicinity, but not under the plume, also deserve to hear from the government.*

DoD reviewed the recommendation and determined that expanding notification was not necessary. The Board agrees with DoD. DoD has notified over 100,000 veterans who may have been exposed to low levels of nerve agent as the result of the Khamisiyah demolition. This notification was based on a modeling process that took a conservative approach and included the appropriate military personnel.

At the Board's October 2000 hearing, the Special Assistant announced that DoD had revised its previous potential exposure assessment based on modeling refinements, better unit locations, and a more precise understanding of the effects of cyclosarin and the total amount of nerve agent present. More than 30,000 veterans were found not to be potentially exposed, while more than 30,000 additional veterans could have been potentially exposed. DoD sent notification letters to all concerned veterans on December 5, 2000, in conjunction with a formal press release. The Board is satisfied that DoD has complied, and

continues to comply, with the spirit of this recommendation.

Chapter 6

OVERVIEW OF HEALTH EFFECTS

Introduction

Following the conclusion of the Gulf War, many veterans reported suffering from a variety of medical symptoms and illnesses. Of the approximately 697,000 men and women deployed to the Persian Gulf area during the war, most returned to productive lives in the military or in the civilian sector. Many veterans, however, complained of a variety of health problems potentially attributable to service in the Gulf War. Due to inadequate management of medical records and the lack of a statistically valid sampling of Gulf War veterans' health problems, it is impossible to state with any accuracy the number of veterans who have medical complaints due to Gulf War deployment.

VA Registry and DoD Comprehensive Clinical Evaluation Program

In 1992, the VA created the Persian Gulf Registry Health Examination Program. In 1994, the DoD created the Comprehensive Clinical Evaluation Program (CCEP). Both these registries provide systematic medical evaluations for Gulf War veterans and collect information about the health of Gulf War veterans. The combined registries include the largest number of Gulf War veterans evaluated to date and the largest group given systematic medical examinations. Currently, more than 100,000 veterans have enrolled in one or both registry programs. The VA and DoD have each published analyses of the data collected in their respective registries.

The VA reported on the registry data of 52,835 veteran participants through September 1996. The most frequently diagnosed conditions among the International Classification of Diseases, Revision 9 (ICD-9-CM), categories were diseases of the musculo-skeletal and connective tissue (25.2 percent), mental disorders (15.1 percent), diseases of the respiratory system (14.3 percent), and diseases of the skin and subcutaneous tissue (13.5 percent). The most commonly reported symptoms were fatigue (20.5 percent), skin rash (18.4 percent), headache (18.0 percent), muscle and joint pain (16.8 percent), and cognitive problems (14.0 percent). Veterans who reported no symptoms, or who were deemed healthy by medical examination, comprised 12.3 percent of the total.

DoD reported on the medical evaluations of 20,000 veterans in the CCEP as of April 1, 1996. The most common ICD-9-CM classifications were "diseases of the musculo-skeletal system and connective tissue" (18.6 percent), "mental disorders" (18.3 percent), and "symptoms, signs, and ill-defined conditions" (17.8 percent). The latter category included 3,558 veterans with a variety of symptoms, including primarily fatigue, headache, memory problems, and sleep disorders. Nine percent of the CCEP participants were found to be healthy.

Both the CCEP and the VA Registry are "self-selected" databases (i.e., enrollment in the registries is voluntary and recruitment is non-specific). Therefore, the veterans enrolled in these registries are not necessarily representative of the entire U.S. Gulf War veterans' population. For example, Army veterans are over-represented in the CCEP enrollment by greater than 50 percent compared to the whole Gulf War population, and both the VA registry and CCEP registry have a higher percentage of females than among those veterans who were actually deployed. Thus, the measured prevalence of symptoms or diseases among veterans who participate in these registries is informative but may not accurately describe the Gulf War population as a whole. DoD acknowledged the limitations of the CCEP in one

publication, stating: "... self-selection of patients, differential eligibility, recall bias, inability to validate self-reported exposures, and lack of an appropriate control group limit the generalization of these findings to other Gulf War veterans."[1]

The VA Registry database was evaluated for five successive time periods, each representing a seven-month interval between August 1992 and July 1995. Self-reported "good" or "very good" health status declined over time for the 44,190 veterans in this analysis, and major symptoms (such as fatigue, skin rash, and headache) increased. Again, these trends may not represent the entire Gulf War veterans population. The Board knows of no other longitudinal analysis of Gulf War veterans' overall health.

Undiagnosed Illnesses

Among the approximately 100,000 veterans evaluated to date from both the CCEP and the VA Registry, about 80,000 (80 percent) either report no adverse health conditions or have medical problems that are commonly recognized diseases or conditions. The approximately 20,000 remaining veterans (20 percent) have been found to have symptoms of undiagnosed illnesses. These undiagnosed illnesses have been the focus of concern among veterans groups, Congress, the media, and, indeed, DoD and the VA.

The symptoms of the Gulf War undiagnosed illnesses include chronic fatigue, skin rash, headache, muscle and joint pain, memory problems, shortness of breath, sleep disturbances, gastrointestinal symptoms, and chest pain. These symptoms are generally unaccompanied by objective physical signs or objective laboratory or radiological findings pointing to specific diagnoses. No consistent association of symptoms, potential toxic exposures, or troop deployment location has been found to identify a single cause of these symptoms or illnesses. The lack of uniformity of the symptoms and the paucity of existing evidence linking sick veterans to one or another environmental exposure suggest that the veterans' illnesses are not one disease, but are multiple diseases with multiple causes. Review panels from the National Institutes of Health, the National Academy of Sciences' Institute of Medicine, and the Presidential Advisory Committee on Gulf War Veterans' Illnesses have also reached this conclusion.

Potential Etiologies of Gulf War Veterans' Undiagnosed Illnesses

Although the Special Oversight Board was not tasked with identifying a cause of Gulf War undiagnosed illnesses, the Board reviewed every published study on Gulf War illnesses; heard testimony from numerous scientists, veterans, and DoD and VA officials; and held a large number of public hearings and open discussions on the issue of veterans' health problems. A complete review of these studies, discussions, and hearings is beyond the scope of this section. Rather, the following is a summary of Board conclusions and observations on Gulf War illnesses.

The symptoms most often reported by veterans suffering from undiagnosed illnesses following deployment to the Gulf War are nearly identical to the most common symptoms reported by patients in community outpatient medical clinics. Fatigue, headaches, muscle and joint pains, chest pain, abdominal pain, and skin rashes account for a large proportion of complaints causing patients to seek care from family practice physicians or general practitioners. The Board concludes, therefore, that some veterans would suffer these same symptoms had they not been deployed to the Gulf War. In other words, some portion of veterans suffering from undiagnosed illnesses would have these same complaints without having been exposed to any potential toxic substance during the war. Indeed, this conclusion is supported by studies comparing the complaints of deployed and non-deployed veterans. However, deployed veterans complain of the above symptoms at two or three times the rate of non-deployed veterans.

The symptoms of veterans' undiagnosed illnesses also bear a striking resemblance to those of patients suffering from chronic fatigue syndrome, fibromyalgia, or multiple chemical sensitivity. These three clinical entities have been the subject of much research over the past decades, yet there have been no definitive, scientifically accepted etiologies found for any of them. It is likely that some Gulf War veterans with the symptoms of undiagnosed illnesses are suffering from one of these three clinical problems. Similar conclusions were reached in studies of veterans from Canada and the United Kingdom as well as from the United States. In a recent study based on a random sample of veterans in the VA Registry, researchers found that approximately 16 percent met the diagnostic criteria for chronic fatigue syndrome, while approximately 13 percent met the criteria for multiple chemical sensitivity. A more specific study of VA Registry patients, using physical examinations as well as symptom questionnaires, found that of 53 veterans studied, 62 percent qualified for the diagnosis of chronic fatigue syndrome, 38 percent met the criteria for multiple chemical sensitivity, and approximately 6 percent qualified for the diagnosis of fibromyalgia. The Board concurs with the IOM conclusions that "some veterans with fatigue and chemical sensitivity fulfill case definitions for chronic fatigue syndrome, multiple chemical sensitivity and fibromyalgia."[2]

The symptoms of Gulf War undiagnosed illnesses are not unique to personnel deployed to the Persian Gulf. After every deployment of troops for war, similar symptoms have occurred in returning service personnel. This "post-war syndrome" has been attributed to the stresses of deployment. It has been described in various ways in every war since the Civil War. In the Civil War, soldiers suffering from headache, chest pain, shortness of breath, palpitations, and similar ailments were said to be suffering from an "irritable heart," later described as Da Costa's syndrome. No specific cause was identified for this problem, although most who had these symptoms had been subject to "hard field service and excessive marching." In the Boer War (1899-1902), a large number of British troops suffered from "debility, a chronic fatigue syndrome with no demonstrable organic cause."[3] Fourteen percent of British troops in that war were awarded pensions for "functional disorders represented by unexplained symptoms." In World War I, "shell shock" was the term used to describe soldiers suffering from fatigue, muscle and joint pains, headache, and mental impairment. Again, no obvious cause or physical findings could explain these symptoms. Large numbers of both American and British troops were found to suffer from this syndrome. Similar findings pertain to World War II ("battle fatigue"), the Korean War, and the Vietnam War.

An exceptional example of this post-deployment syndrome from the Gulf War involves Canadian Naval personnel aboard HMCS *Protecteur*. This vessel, a 564-foot armed support ship with a crew of 370, deployed to the Persian Gulf during the Desert Shield buildup of troops. The crew aboard received no immunizations for anthrax or botulism; was not exposed to DU, oil well fires, or CW; and did not take PB tablets for prophylaxis against nerve agents. Prior to the onset of Operation Desert Storm, the complete crew re-deployed back to Canada, and a replacement crew was deployed aboard the vessel for the duration of the war. This replacement crew also had no exposure to DU or CW, but they were exposed to oil well fires; they did take PB tablets; and they were immunized against anthrax. Following the war, a survey of both crews for symptoms of illnesses was performed. Identical proportions of each crew were found to be suffering from the symptoms of undiagnosed illnesses. The only significant exposure factors shared by each crewmember were simply deployment to a war zone and routine pre-deployment immunizations. Thus, deployment itself was a likely explanation for the development of illness in at least some of the HMCS *Protecteur* crewmembers.

Peacekeeping deployments since the Gulf War have also been associated with these same symptoms of undiagnosed illnesses. Some British troops have complained of a "Balkan Syndrome" following their deployment to Bosnia and Kosovo. Although a few British troops felt that exposure to DU dust was the

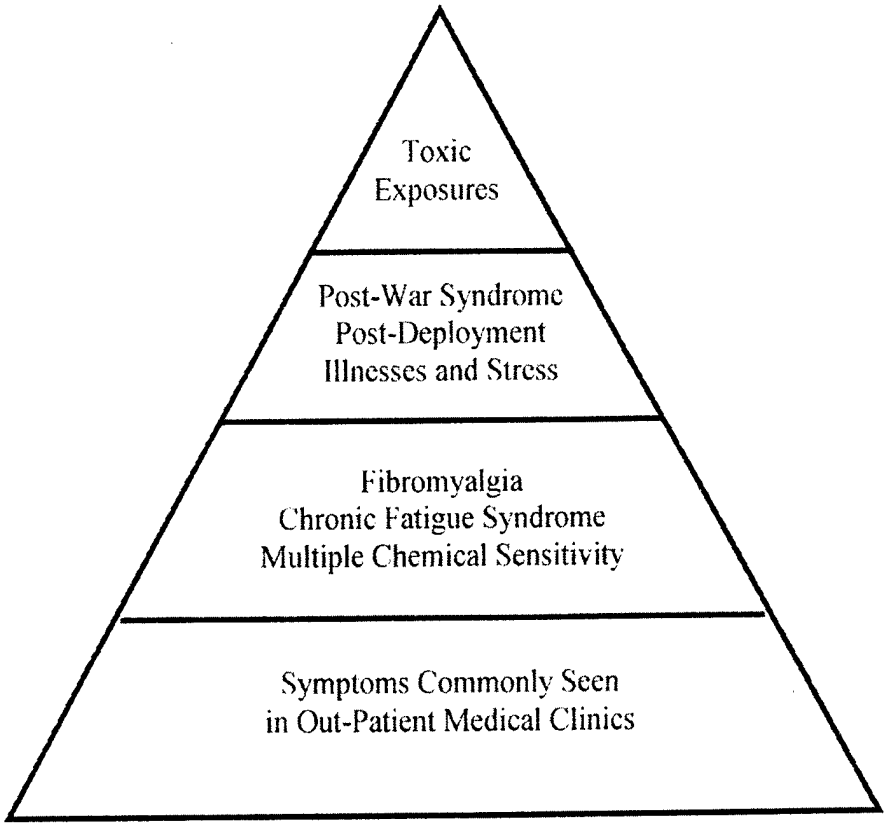
cause of their health problems, a U.K. governmental and scientific investigation into the issue found no link between the troops' symptoms and DU pathophysiology or exposure.

In another peacekeeping deployment, some of the nearly 9,000 Canadian troops returning from a 1993-95 United Nations operation in Croatia complained of a variety of symptoms similar to the undiagnosed illnesses discussed above. A number of these troops suspected that exposure to environmental contaminants in the "red dirt" of southern Croatia was the specific cause of the illnesses. A thorough Canadian governmental investigation revealed, however, that stress was the major cause of the ailments, stating: "Stress quickly emerged as an issue as the Board listened to soldiers recall the events of their missions. They recounted desperate efforts to build defensive structures ..., frequent shelling and small arms fires, the constant threats posed by landmines, the horrors of recovering the bodies of victims of ethnic cleansing, and weeks of living and operating in dire circumstances without a break ... in addition to the chronic stress due to frequent deployments, lengthy pre-deployment training, career courses between deployments, all amid an organization in the process of downsizing." The Canadian Board concluded "It is highly probable that at least some of these symptoms result from the very high level of chronic stress experienced during the operation."[4]

The Board concludes that it is highly likely that a proportion of Gulf War veterans suffering from the symptoms of undiagnosed illnesses fall into the generalized category of "post-war syndrome" or post-deployment illness. As with all previous wars, stressful deployments to a combat zone can create significant medical problems for returning troops. The fact that no specific cause or toxic exposure accounts for the signs or symptoms of post-deployment illness makes it no less debilitating for the troops involved. The Board recognizes that veterans suffering from these symptoms of post-deployment illness have real medical problems that can pose a significant disruption in their lives.

The remaining possible etiology of Gulf War undiagnosed illnesses is the potential exposure to toxic substances encountered by troops in the Gulf War and/or the exposure to medications and vaccines used by troops prior to and during deployment. This subject has been the primary focus of over $155 million in federally funded research into Gulf War illnesses, with 192 research projects either under way or proposed in both the private and federal sectors. The subject of toxic exposures will be reviewed in the following section. In addition, a separate section will discuss the possible role of stress in Gulf War illnesses.

The possible etiologies of the symptoms of Gulf War undiagnosed illnesses are summarized in the following diagram. The four etiologies discussed above are shown as layers in a pyramid. The pyramid depicted is used for graphical purposes and is not meant to represent the proportion of illness attributable to each factor. No data or research findings to date allow for definitive conclusions as to how many ill veterans can be accounted for by each of the possible etiologic categories.



Possible Etiologies of Gulf War Undiagnosed Illnesses

Potential Exposure Factors

The potential exposures for Gulf War illnesses, with one exception, are chemical and biological substances, both man-made and endogenous. They include:

- Biological warfare agents (BWA)
- Chemical warfare agents (CWA)
- Depleted uranium (DU)
- Indigenous infectious disease
- Oil well fires
- Pesticides
- Pyridostigmine bromide (PB)
- Sand
- Vaccines
- Stress (see Chapter 7 for a full discussion)

This section presents brief summaries of the published scientific literature concerning some of the possible environmental causes of Gulf War illnesses. It should be noted that none of the studies to date were designed to answer the question, "Is this exposure factor a cause of undiagnosed Gulf War illnesses?" In the few cases where there are studies of specific exposure factors, researchers have been concerned with the possible correlation of exposures with specific (defined or diagnosed) health outcomes-not with undiagnosed illnesses.

No study can determine with any certainty whether a measured association between exposures and health outcomes represents a cause and effect. Scientists and analysts have difficulty making statistically valid conclusions about causality because of the limited information characterizing exposures during the Gulf War. Few measurements of exposures were recorded during the war, and most survey data rely on veterans' memories of events, now nearly ten years later, or their judgment on whether they were exposed to a particular factor. The DoD has provided some estimates of exposures for the following substances: oil well fires emissions, depleted uranium, particulate matter, sand (not yet released), chemical warfare agents at Khamisiyah, CARC paint, and pesticides. The quality of these exposure estimates is generally unknown. DoD and the National Oceanic and Atmospheric Administration were able to partially validate modeled exposure estimates to oil well fire emissions by comparing the modeled results to ground level air measurements of sulfur dioxide concentrations. However, the Board has not seen any analysis of the quality of other exposure estimates by any method. We expect that the exposure estimates to some factors are poor (e.g., pesticide use, diesel fumes, and exhausts) because there do not appear to be reliable methods to estimate those exposures. The Board concurs with the Institute of Medicine's comments on exposure data: "Determining whether or not Gulf War veterans face an increased risk of illness because of their exposures during the Gulf War requires extensive information about each exposure (e.g., the actual agent(s), duration of exposure, route of entry, internal dose) and documentation of adverse reactions. Unfortunately, very little is known about most Gulf War exposures."[5] Thus, nearly all studies on Gulf War exposures and potential associations with health effects contain elements of measurement uncertainty, recall bias, selection bias, and other potential confounding variables.

Biological Warfare Agents (BWA)

The CIA, DoD, and other agencies have found no evidence that Iraq used BWA during the Gulf War. There is no dispute, however, that the Iraqi military possessed bulk and weaponized biological warfare agents (e.g., anthrax and botulinum toxin). A review of Gulf War hospitalization records identified no cases of anthrax or botulism during the war. Furthermore, among the 225 non-battle-related deaths, only one person died of an infectious disease, meningococcosis.

Chemical Warfare Agents (CWA)

The CIA, DoD, and other agencies found no evidence that Iraq used chemical weapons or chemical warfare agents during the Gulf War. The Board found that the only documented evidence about potential exposures to CWA in theater resulted from a large-scale postwar demolition of Iraqi munitions stockpiles at Khamisiyah. Modeling by DoD and the CIA suggests that the Khamisiyah release of the chemical warfare agents sarin and cyclosarin resulted in only low-level releases and only extremely low-dose potential exposures. These potential exposures did not result in any acute symptoms or any immediately reported adverse health outcomes associated with chemical nerve agent exposure. No chemical alarms sounded in the areas where troops might have been exposed. In fact, recent analysis of the Khamisiyah demolition reveals that no troops were situated in any area where sarin and cyclosarin potential exposures would have reached sufficient concentration to activate a chemical alarm. Furthermore, postwar hospitalization records do not indicate an increased prevalence of chronic disease among those veterans who were possibly exposed to low-dose CWA from the Khamisiyah demolitions.

OSAGWI's investigations into possible exposures to chemical warfare agents during and after Operations Desert Shield/Desert Storm (i.e., those incidents reported in seventeen case narratives) could not confirm any other CWA exposure. These investigations identified fewer than ten individuals who were associated with those incidents and who reported acute or chronic illnesses.

Based on the current body of evidence in the medical literature on studies of humans accidentally exposed to organophosphate nerve agents and on controlled animal exposures to organophosphate nerve agents at levels causing no acute signs or symptoms, low-level exposures do not produce chronic illnesses. However, gaps exist in the scientific literature regarding the potential long-term health consequences of exposure to low concentrations of nerve agents that are initially asymptomatic. VA, DoD, and DHHS have initiated research projects in this area. The Board concurs with the IOM's recommendations that research in this area focus on the "long-term effects of acute, short-term sarin [and cyclosarin] exposure at doses that do not cause overt ... effects" and also that research focus on "genetic factors that may alter susceptibility to sarin toxicity."[6]

Depleted Uranium (DU)

Allied forces used DU in tank armor and in penetrators of various antitank munitions during the Gulf War. Although Iraq did not possess DU rounds, friendly-fire incidents caused more than 110 U.S. soldiers to be exposed to DU following impact of DU rounds to their own or others' vehicles or to damaged vehicles they inspected, recovered, or repaired.

The likely routes of exposure are primarily skin and muscle penetration of DU fragments and inhalation of DU dusts and aerosols. In general, DU penetrators pyrolyze (catch fire) upon impact and form insoluble uranium oxide dusts that may be inhaled. DU fragments in muscle tissue and insoluble DU oxides in the lung slowly release uranium to the bloodstream over many years. Soluble forms of uranium are excreted in the urine. The primary target organs for uranium toxicity are the kidneys, bones, and lungs, although other organ systems may be affected.

The VA and the Armed Forces Radiobiological Research Institute are both studying the long-term health effects of embedded DU in a small number of Gulf War veterans who were the victims of friendly-fire incidents. OSAGWI feels these veterans were exposed to the highest levels of DU during the war, since they not only have small masses of embedded DU penetrator fragments, but they were also exposed to inhalation of DU dusts and aerosols within their vehicle from the impact of the DU penetrator. The

studies have found no evidence of significant adverse health effects from DU in these veterans. Renal function is unimpaired, even in those veterans with the highest levels of urine uranium excretion. On a few neurocognitive tests, veterans with higher urine uranium levels performed less well (on computerized cognitive tests, but not on pen-and-paper cognitive tests) than those with lower urine uranium levels. These neurocognitive tests were only given to a small number of veterans with DU fragments, and the study authors stated that the results from a few veterans with complex medical histories might have skewed the overall results. The clinical significance of these results is unknown.

Although semen levels of DU were elevated in veterans with embedded DU fragments (as would be expected, since dissolved DU will be found in nearly all tissue fluids), semen physiological characteristics (volume, concentration, morphology, and motility) were found to be the same in veterans with high urinary levels of DU as in veterans with low urinary levels of DU. More important, to date there have been no birth defects found in children fathered by veterans with embedded DU fragments.

To date there have been no studies assessing the effects of inhaled DU in Gulf War veterans. There have been mortality studies of miners exposed to uranium dusts that show higher-than-expected rates of death from lung cancer. However, these excess deaths may be attributed to other toxic inhalants present in the mines, such as radon, and they may not be a result of inhalation of uranium only. Also, in many of the uranium miner studies, use of tobacco was not evaluated and it could have contributed to some of the deaths. In studies of workers at uranium mills and uranium processing plants where there was no excessive exposure to radon, no increase in deaths was noted. The U.S. Army is currently conducting studies to estimate the possible extent of inhalation exposures to survivors of military vehicles hit by DU munitions and to personnel working in and around DU-contaminated vehicles.

The Board is aware that DoD, the Department of Energy, and the Nuclear Regulatory Commission (NRC) are investigating the levels of transuranic radionuclides (such as plutonium) that may have contaminated some of the lots of depleted uranium that were used to manufacture tank armor and penetrators used during the Gulf War. To date, no lots of DU used in tank armor or munitions have been found to contain levels of transuranics that appreciably increase the health risk from exposure to the DU, nor has the NRC yet required DoD to obtain additional licensing to maintain DU munitions.

The Board concludes that DU is unlikely to be the cause of either the unexplained illnesses among Gulf War veterans or the diagnosed illnesses found during CCEP and VA Registry evaluations. The Board concurs with the Institute of Medicine recommendations for: (1) "...additional studies in experimental animals to investigate the specific effects of depleted uranium"; and (2) "long-term follow-up of veterans exposed [and potentially exposed] to depleted uranium, including ... [those] involved in cleanup operations or radiation control units."[7]

Indigenous Infectious Disease

During World War II, infectious diseases such as cutaneous leishmaniasis, hepatitis, sandfly fever, schistosomiasis, typhus, and typhoid fever had a significant impact on military operations in the Middle East. However, during the Gulf War there were few reported cases of infectious diseases and only one mortality attributable to an infectious disease. A review of DoD hospital records showed no reported cases of cholera, typhoid fever, amoebic dysentery, giardiasis, schistosomiasis, echinococcosis, brucellosis, sandfly fever, anthrax, or botulism. Only a few cases were identified of each of the following: cutaneous leishmaniasis (19 cases), visceral leishmaniasis (12 cases), *Coxiella burnetii* infection (i.e., Q Fever, 3 cases), malaria (7 cases), meningococcosis (2 cases), and West Nile fever (1 case).

The only endemic infectious diseases demonstrated to cause chronic illness among Gulf War veterans were cutaneous leishmaniasis (CL) and visceral leishmaniasis (VL). The mode of transmission of leishmaniasis is through bites from infected sand flies; person-to-person transmission does not occur. Unlike CL, which causes a characteristic ulcerative or nodular skin rash that can persist for more than a year without treatment, VL presents nonspecific effects like those of Gulf War illnesses (arthralgia, fever, malaise, abdominal pain, diarrhea, nausea, chronic fatigue, rigors, weight loss, coryza, nonproductive cough, and headache). However, there were very few confirmed cases of VL among sick Gulf War veterans who sought treatment in theater, in stateside DoD medical treatment facilities upon their return from the Gulf, or in VA facilities.

Mycoplasma Fermentans Infection

Mycoplasma infection has been proposed as a cause of veterans' undiagnosed illnesses, with many of the symptoms experienced by the Gulf War veterans explained by aggressive pathogenic intracellular mycoplasmal infections (i.e., *Mycoplasma fermentans incognitus* or *Mycoplasma penetrans* produces chronic symptoms long after the initial, and brief, exposure). Some experts disagree with this proposition and claim that, with the exception of mycoplasma pneumonia, forty years of research have failed to prove a clear connection between mycoplasmas and serious human diseases. Researchers favoring the mycoplasma theory also claim that a majority of chronic fatigue or fibromyalgia patients whom they studied had multiple mycoplasma infections (30.8 percent with double infections, 22 percent with triple infections) in their blood samples, compared with none in a healthy control group. Infections with multiple mycoplasma species also appeared to be associated with increased duration of illness. Researchers studying symptomatic and asymptomatic deployed and non-deployed Gulf War-era veterans, however, did not observe greater prevalence of *Mycoplasma fermentans* antibodies in the blood of sick Gulf War veterans.

Those researchers favoring the mycoplasma theory believe that symptoms arising from mycoplasmal infections could be treated by a long-term course of antibiotics (specifically, doxycycline, one of the tetracycline class of antibiotics). In early 2000, the Departments of Veterans Affairs and Defense began a treatment trial of deployed Gulf War veterans who presented symptoms of Gulf War illness and tested positive on a controversial laboratory test for *Mycoplasma* species. The purpose of the study was to see whether a daily regimen of 200 milligrams doxycycline for twelve months could improve the functional status of the veterans compared to veterans given a placebo. Secondary objectives of the study were to determine whether the treatment regimen reduces symptoms (such as pain, fatigue, and neurocognitive concerns), whether it converts mycoplasma-positive patients to mycoplasma-negative status, and whether benefits of the treatment persist after the treatment is ended. The doxycycline treatment trial is being conducted nationwide at twenty-six VA Medical Centers and two DoD research facilities. Recent analysis of laboratory results, however, has called into serious question the validity of the laboratory tests used to diagnose the presence of mycoplasma species. If the test is found to be invalid, then a large number of veterans are being exposed to a long-term course of antibiotics without evidence of an infection. The ethics of this experiment are thus in question. A decision by DoD and VA to continue the treatment trial is currently under review.

Some Gulf War illness veterans and advocates claim that Gulf War illnesses are contagious, capable of infecting family, co-workers, friends, and even pets. However, there exist neither epidemiological evidence nor laboratory-based infectious disease studies to support the hypothesis that contagious *Mycoplasma sp.* or another microorganism is a cause of Gulf War illnesses.

Oil Well Fires

The U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM) estimated troop exposures to oil well fires emissions during and after the Gulf War. CHPPM concluded that the only component of the pollution from oil well fires that was at levels of health concern was particulate matter. However, the Board noted that CHPPM did not fully evaluate the risks from oil fire emissions and recommended to CHPPM that it reconsider its risk evaluations and include in its estimates exposures to raining oil or oil mists. CHPPM agreed to reconsider its oil well fire exposure and risk assessments.

The RAND Corporation conducted toxicological evaluations of air concentration data of those substances that CHPPM measured in the Persian Gulf between May and December 1991, after many of the oil well fires had been extinguished. RAND concluded that particulate matter may be a cause of respiratory problems, especially among those veterans who were predisposed to asthma, but other pollutants were not at levels of health concern.

Some researchers have noted that self-reported levels of asthma or other respiratory illness are higher in veterans exposed to oil fire emissions compared to veterans who were not exposed. Other researchers observed a poor agreement between self-reported exposure to oil well fire smoke and modeled exposure estimates; still other researchers observed good agreement between self-reported and modeled exposure estimates. None of the studies of respiratory illnesses in Gulf War veterans and exposure to oil well fire emissions have yet been published in peer-reviewed journals. The Board concludes that there are insufficient data to state whether oil well fires are or are not a factor in the undiagnosed illnesses of Gulf War veterans.

Pesticides

Some of the pesticides used in the Gulf War are similar to nerve agents. Studies have demonstrated that many of these pesticides are toxic to humans above threshold exposure levels that vary with each pesticide. The Board is not aware of any published estimates of pesticide exposure to Gulf War veterans or of any published peer-reviewed studies looking at the relationship between pesticide use (or exposure) and Gulf War illnesses.

OSAGWI is planning to publish an environmental exposure report on pesticide use during the Gulf War, and the RAND Corporation will provide DoD two reports on pesticides use during the Gulf War. DoD, DHHS, and VA have funded university-based studies on the health effects of pesticides, with and without concurrent exposures to stress and other chemicals. Finally, the Institute of Medicine will publish an analysis of the potential role of pesticides in Gulf War illnesses.

Pyridostigmine bromide (PB)

During the Gulf War, the United States and some allied and coalition forces were provided PB tablets as prophylaxis against possible exposure to the nerve agent Soman. This was necessary since PB is the only possible prophylaxis for this toxin. Based on the number of tablets delivered but not returned in the system, an estimated 250,000 to 300,000 U.S. personnel received some PB during deployment.

PB is a reversible inhibitor of acetylcholinesterase (AchE), a critical enzyme used to deactivate the neurotransmitter acetylcholine. Repeated exposure to PB has been suggested as a potential cause of the persistent fatigue reported among Gulf War veterans due to pathological changes in neurons affecting skeletal muscles. Such nerve degeneration from PB loading has been studied in animals but not in humans. Other research indicates that the abnormal physiologic changes in nerve endings exposed to PB

are reversible upon cessation of exposure (in vitro), and therefore PB exposure could not explain the chronic fatigue reported by some Gulf War veterans.

Gulf War deployed veterans were exposed to a variety of organophosphate pesticides (e.g., chlopyrifos, malathion) to protect against insects carrying diseases. There has been some suggestion that besides being neurotoxic itself, PB may lead to neurotoxicity following concurrent exposures to organophosphate compounds by interfering with the enzymatic degradation of the organophosphates, allowing them to enter the central nervous system. However, when using handgrip strength as an instrument for measuring muscle strength in humans, it was demonstrated that postwar handgrip strength was not associated with PB intake or exposure to pesticides. As with other exposures, military records from the Gulf War are inadequate to validate PB ingestion with or without concurrent pesticide exposures.

The Board concurs with both the RAND study on PB and the Institute of Medicine analysis that "available evidence is of insufficient quality, consistency or statistical power to permit a conclusion regarding the presence or absence of an association [of PB use with adverse health effects] in humans."[8] Further study is clearly needed in this area, since PB remains the only viable prophylactic agent for Soman exposure, and DoD intends to continue its use in future conflicts (although such use without informed consent will require a specific directive from the President).

Sand

Some researchers have suggested that inhalation of exceptionally fine-grain sand from the Arabian Peninsula can lead to a silicon-based immune system failure, possibly accompanied by concomitant opportunistic infections or toxemia from silicon dust (and other metals found in sand) in the bloodstream. The authors termed this illness "Al Eskan" disease after observing that the prevalence of respiratory illness among Gulf War veterans residing in Al Eskan Village, Saudi Arabia, was as high as 43 percent and that the fine sand at Al Eskan was commingled with large amounts of pigeon droppings. The authors suggested that the inhabitants of the desert have acclimated to the environment but that the immune depression from inhalation of sand made many service members susceptible to infectious agents and environmental toxicants, such as oil well fires pollution, depleted uranium, and chemical warfare agents. The authors have not published any studies of sick Gulf War veterans. No other researchers have published studies concerned with the possible link between inhalation of sand and Gulf War illnesses. However, CHPPM is currently modeling inhalation exposures to sand during the Gulf War. The Board concludes that there is insufficient information to state whether there is or is not an association of exposure to sand with the symptoms of Gulf War undiagnosed illnesses.

Vaccines

There are no reproducible scientific studies or existing data that show that routine vaccinations have significant detrimental effects on military personnel. All military vaccines are approved by the Food and Drug Administration (FDA), and DoD has a permanent position on the Advisory Committee on Immunization Practices (ACIP), coordinated by the U.S. Centers for Disease Control and Prevention (CDC). In addition, DoD is an active participant in the national Vaccine Adverse Event Reporting System (VAERS).

Military personnel receive routine vaccinations during their initial entry into the armed forces. They receive routine revaccinations and booster immunizations throughout their careers in accordance with the appropriate schedules specified by DoD vaccination directives.

During the Gulf War, two additional vaccinations were provided to select personnel. Approximately 8,000 service members were immunized in theater with the botulinum toxoid, an investigational new drug vaccine. In addition, about 150,000 service members and a proportion of forward-deployed operational forces were immunized in theater with the FDA-approved anthrax vaccine. The absence of accurate immunization records (and record keeping) has been highlighted in multiple reports.

The FDA's approval of the anthrax vaccine relied heavily on a 1962 study indicating the vaccine was safe and had an effectiveness of 92.5 percent (with a lower confidence limit of 65 percent). The incidence of individual reactions to the vaccine was relatively low: 2.8 percent of recipients had an edema-producing local reaction, and 0.2 percent had systemic reactions. These adverse event rates were comparable to other vaccines commonly in use. However, in its recent report on Gulf War health issues, the Institute of Medicine, after reviewing all available data, stated: "The committee concludes that there is inadequate/insufficient evidence to determine whether an association does or does not exist between anthrax vaccination and long-term adverse health effects."[9]

Some researchers have speculated that multiple vaccines given over a short period of time could adversely affect the immune system, potentially leading to adverse chronic health problems. A recent study in the United Kingdom found that personnel receiving the most vaccines prior to deployment had a slightly higher (but statistically significant) incidence of symptoms of undiagnosed illnesses. The Institute of Medicine, in evaluating this issue, found that, "The U.K. Gulf War studies provide some limited evidence of an association between multiple vaccinations and long-term multisymptom outcomes, particularly for vaccinations given during deployment. There are some limitations and confounding factors in these studies, and further research is needed."[10] Another U.K. study showed that those who received their immunizations prior to deployment were less symptomatic than those who received their immunizations in theater, regardless of the number of immunizations received.

Some Gulf War veterans expressed concern that squalene, an endogenous hydrocarbon used by the body in the biochemical synthesis of cholesterol, may have been added to some Gulf War vaccines to enhance the antibody response of the immunization. In particular, these veterans have focused on the anthrax vaccine. These concerns were bolstered by a study by Dr. Asa and colleagues purportedly showing that Gulf War veterans with multisymptom illnesses had antibodies to squalene, whereas veterans who were healthy had no squalene antibodies. DoD has steadfastly maintained that no squalene was added to the anthrax immunizations. Dr. Asa has repeatedly rebuffed invitations from this Board to discuss the results of the study.

The IOM had the following comments concerning Dr. Asa's study: "This study has several shortcomings. The subjects were self-selected, rather than being chosen at random from a larger sample, which can introduce substantial selection bias and does not allow inferences to the broader population of Gulf War veterans. Sample sizes were small, and the study may suffer from misclassification errors since the group of Gulf War veterans categorized as healthy (n=12) was not devoid of individuals with serious symptoms. ... Further, the report provides inadequate evidence that the assay is able to accurately detect antibodies to squalene ... [and] the authors did not show that the assay was specific to squalene. ... The committee does not regard this study as providing evidence that the investigators have successfully measured antibodies to squalene."

In March 2000 the FDA, in a letter to Representative Jack Metcalf (R-Washington), stated that "neither the licensed vaccines known to be used in the Gulf War, nor the one investigational product known to have been used, contained squalene as an adjuvant in the formulations on file with the FDA."[11] The FDA tested select lots of anthrax and other bacterial vaccines (e.g., diphtheria and tetanus) for the

presence of squalene. They found extremely small amounts (parts per billion) of squalene in all of the bacterial vaccines tested -- both anthrax and the common diphtheria and tetanus vaccines. The Board concludes that squalene is a highly unlikely cause of the multisymptom illness of some Gulf War veterans. If the extremely small levels of squalene in the anthrax vaccine (which was not administered to all deployed troops) were capable of causing symptoms in a small fraction of Gulf War veterans, one would logically expect that a very large number of military personnel, and civilians as well, to include school-age children, would have these symptoms, since all troops and a very large portion of the civilian population have received diphtheria and tetanus immunizations. The absence of such a "syndrome" in both groups clearly mediates against a role for squalene in Gulf War illnesses.

Epidemiologic Studies of Gulf War Veterans' Health

No person or agency has studied the health of all 697,000 deployed U.S. Gulf War veterans. However, the VA is currently conducting a study (the VA National Survey) of more than 15,000 U.S. Gulf War veterans to see how their health compares with that of 15,000 non-deployed Gulf War-era veterans. This study is the first and only study that is randomized over (very nearly) the entire U.S. Gulf War veterans population. Although the study employs a self-report survey questionnaire to measure veterans' health symptoms and potential or suspected exposures, it also includes a review of medical records and medical examinations of a sample of the larger study group.

Several studies of smaller numbers of Gulf War veterans have provided information regarding veterans' health problems. The limitation of these studies is that the participating veterans were not selected at random over the entire Gulf War veterans' population; the findings are therefore not necessarily representative of the entire deployed Gulf War veterans population. Also, they used self-report surveys and may represent only the individual's perception of illnesses, not specifically diagnosed physical illnesses. Some of the studies included a medical follow-up to validate survey data while others did not.

The natural course of Gulf War veterans' illnesses over time remains generally unknown because no fully random, longitudinal studies of symptom experience (i.e., repeat monitoring of the same group of veterans over time) have been conducted and reported in the medical literature. However, the VA has published one report where some veterans' medical records were reviewed at multiple points in time over two and a half years. Another study presents the change between two points in time in the number of self-reported symptoms by selected veterans from New England and New Orleans. These studies provide insight into how some veterans' health changed over time, but they are not necessarily indicative of how the health of Gulf War veterans as a whole has changed.

Clinical, toxicological, and epidemiological investigations into the health of veterans who took part in the Gulf War have resulted in widely varying views in the scientific community regarding the causes of Gulf War illnesses. To date, no specific cause of these illnesses has been scientifically validated. Nevertheless, some veterans remain convinced that their adverse health conditions are a consequence of wartime exposure to a host of potentially hazardous substances, either singly or in combination. In addition, some veterans believe that they have an illness that has or will cause birth defects in their children or that their illnesses will be contagious to their families. To date, however, there is little or no evidence in the peer-reviewed scientific literature supporting this concern.

The following section summarizes some of the major studies that have sought to characterize Gulf War veterans' symptoms. This summary will include the VA National Survey (introduced above) that is randomized over the entire U.S. Gulf War veterans population, several studies of smaller groups of U.S. Gulf War veterans, and studies from the United Kingdom.

The National Health Survey of Persian Gulf Veterans, Department of Veterans Affairs

Gulf War veterans reported a higher prevalence of all forty-eight symptoms on the questionnaire than did non-Gulf War veterans. The most frequently reported severe symptoms were back pain, runny nose, joint pain, headaches, anxiety, and difficulty sleeping. The most frequently reported chronic medical conditions (in decreasing order) were sinusitis, gastritis, dermatitis, arthritis, and frequent diarrhea. Gulf War veterans were three times more likely to report that their health status was poor compared with non-deployed Gulf War veterans; they also reported a substantially lower prevalence of excellent health than did non-deployed veterans. Gulf War veterans reported a 200 percent higher rate of functional impairment and an almost 50 percent higher rate of limitation of employment, and they sought more medical care than non-deployed veterans. The largest rate differences between Gulf War veterans and non-Gulf War veterans were consistently observed among National Guard members, followed by reserve unit members and active unit members. National Guard members also reported higher rates of exposure in nineteen out of twenty-three exposure categories compared with other deployed veterans. Leading exposures included diesel, kerosene, and/or other petrochemical fumes (including tent heater or vehicle exhaust); eating local food; and wearing chemical protective gear (other than during training) or hearing chemical alarms sounding. A substantial number of veterans reported exposure to nerve gas (9.6 percent) and mustard gas (4.8 percent). However, Gulf-deployed veterans reported the incidence of many diseases (e.g., diabetes, coronary heart disease, stroke, and asthma) at about the same rates as their non-deployed counterparts. This study began in 1995. Data evaluation and medical follow-up of a portion of the study participants is ongoing.

Iowa Persian Gulf War Veterans Study

The University of Iowa conducted a study of 3,695 randomly selected veterans who listed the State of Iowa as their home of record. Researchers surveyed the veterans concerning their health and analyzed the results using factor analysis.

Approximately one half of the deployed veterans (n=1,896 from 889 units) and 14 percent of the non-deployed controls (n=1,799 from 893 units) reported health problems they attributed to military service during 1990-91. Compared with the non-deployed controls, the deployed veterans reported significantly greater frequency of 123 of 137 symptoms. The greatest differences in reported symptoms between the deployed veterans and non-deployed controls included polyarthralgia (multiple joint pain), fatigue, joint stiffness, headaches, and memory problems.

The factor analysis conducted by these researchers identified three replicable patterns (symptom factors) in both the deployed and the non-deployed veterans. The symptom patterns were as follows: somatic distress (joint stiffness, myalgia, numbness or tingling, headaches, and nausea), psychological distress (feeling nervous, worrying, feeling distant or cut off, and depression), and panic (anxiety attacks, a racing or skipping heart, attacks of chest pain, and attacks of sweating). These patterns were found in similar proportions in both the deployed and non-deployed veterans' groups.

The factor analysis results indicate that the health complaints of Gulf War veterans are comparable to those of the general military population and are not consistent with the existence of a unique Gulf War syndrome. However, these results do not explain the large disparity between the proportion of deployed veterans who reported health problems compared to non-deployed veterans, and they may not be applicable beyond the military population of Iowa.

Pennsylvania Air National Guard Study

In 1994, medical epidemiologists from the U.S. Centers for Disease Control and Prevention (CDC) conducted interviews and examinations of fifty-nine Gulf War veterans at a VA medical center in Pennsylvania to investigate veterans' unexplained illnesses. The most frequently reported "moderate" or "severe" symptoms were fatigue (61 percent), joint pain (51 percent), nasal or sinus congestion (51 percent), diarrhea (44 percent), and joint stiffness (44 percent). However, standardized physical examinations and review of VA laboratory tests did not reveal consistent abnormalities.

In the second phase of this investigation, the researchers surveyed more than 3,900 veterans and active duty Air Force personnel from four units with questions describing the frequency, duration, and severity of thirty-five symptoms most commonly mentioned during the phase 1 investigation. In all units, the prevalence of thirteen chronic symptoms was significantly greater among deployed Gulf War veterans than among those not deployed.

The researchers then developed multisymptom-illness case descriptions from clinical observations and factor analysis. Analysis of the data showed that Gulf War veterans were significantly more likely to meet criteria for severe and mild-to-moderate illness than were non-deployed personnel. The prevalence of chronic symptoms was highest among severe cases. However, the finding that 15 percent of non-deployed personnel also met the illness criteria adopted in this analysis indicates that the illness is not unique to Gulf War service. Deployment to the Gulf was the most significant risk factor for both severe and mild-to-moderate illnesses.

U.K. Servicemen Who Served in the Gulf

A U.K. study used a cross-sectional survey of a random sample of U.K. Gulf War veterans (deployed and not deployed to the Gulf) and Bosnia-conflict veterans. The survey included questions about deployment, exposures, symptoms, and illnesses. The Gulf War-deployed veterans reported symptoms significantly more frequently than both non-Gulf-deployed veterans and Bosnia-deployed veterans. Also, Gulf War-deployed veterans reported potentially harmful exposures more often than the other two groups. The authors suggest that, since ill health was associated with exposures in all three groups, the illnesses may not be unique to Gulf War-deployed veterans. The authors noted that the differences in the reported exposures among the three groups were not substantial. However, the excess reporting of ill health among Gulf-deployed veterans over Bosnia-deployed veterans suggests that adverse health effects associated with service in the Gulf were due to something "over and above" deployment to an unfamiliar hostile environment, and may be due to "different experiences of hazardous exposures" in the Gulf compared to other environments. The authors noted that multiple vaccinations were associated with poorer health, regardless of deployment. The U.K. researchers conducted a factor analysis on their data and found, much like in the Iowa study, that the symptom patterns were similar across all three of their study populations, suggesting that the illnesses among Gulf War veterans are not unique.

Summary

The results of the Iowa, Pennsylvania Air National Guard, and United Kingdom studies above suggest the following:

1. The symptoms reported by veterans appear to be consistent across the studies, with minor variations in rank order and percent of the veterans reporting them.
2. The pattern of illnesses is not markedly different between the deployed Gulf War veterans and control groups, although the proportion of veterans reporting symptoms is significantly greater among deployed veterans.

These studies do not address causality of Gulf War illnesses. Rather, they show that Gulf War veterans report various symptoms at a higher rate than non-deployed veterans of the same era and at a higher rate than veterans deployed to sites other than the Persian Gulf. Whether this higher prevalence of symptoms is due to exposure factors unique to the Gulf War, to the sensitivity of Gulf War veterans to potential illnesses secondary to their deployment, or to other factors cannot be determined from the available data.

Conclusions

1. A substantial number of Gulf War veterans suffered significant illness, impairment, and disability following their deployment to the Persian Gulf.

2. Studies published to date have not identified a cause of undiagnosed Gulf War illnesses.

3. The symptoms of Gulf War undiagnosed illnesses are similar to those found in the general population and are similar to those of veterans returning from combat duty in previous wars and from contemporary peacekeeping duties.

4. The symptoms of Gulf War undiagnosed illnesses are similar to those of patients suffering from chronic fatigue syndrome, fibromyalgia, and multiple chemical sensitivity.

5. Deployment stress is a likely causal or potentiating factor in at least some Gulf War veterans' illnesses.
6. Epidemiological studies of Gulf War veterans are compromised because exposure estimates for many factors are of poor quality or are nonexistent. Self-reported exposures, which are subject to recall bias, misinformation, or other confounding variables, are often the only exposure data available.
7. Further research is necessary to evaluate the potential relationship between toxic exposures and symptoms of undiagnosed Gulf War illnesses.

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[1] Department of Defense, *Comprehensive Clinical Evaluation Program for Persian Gulf War Veterans. CCEP Report on 18,598 Participants*, Apr 1996.

[2] C. E. Fulco, C. T. Liverman, and H. C. Sox, eds., *Gulf War and Health*, Vol. 1, *Depleted Uranium, Sarin, Pyridostigmine Bromide, Vaccines* (Institute of Medicine, National Academy Press, Sep 2000).

[3] United Kingdom Ministry of Defence, *Research into War Syndromes: Psychological Impact of Modern Warfare* (United Kingdom, 1999).

[4] *Board of Inquiry Report: Croatia,* Department of National Defence, Canada, Jan 2000.

[5] Fulco, Liverman, and Sox, op. cit.

[6] Ibid.

[7] Ibid.

[8] Ibid.

[9] Ibid.

[10] Ibid.

[11] M. Plaisier, Associate Commissioner of Legislation, FDA, letter of Mar 20, 2000.

Chapter 7

THE ROLE OF STRESS AS A CONTRIBUTING FACTOR IN GULF WAR UNDIAGNOSED ILLNESSES

This chapter summarizes the Board's observations concerning stress as a contributing factor in the symptoms of Gulf War undiagnosed illnesses. The Board concludes that stress is likely a primary cause of illness in at least some Gulf War veterans and a likely secondary factor in potentiating other causative agents in producing undiagnosed illnesses among some Gulf War veterans. It is worth repeating, as stated earlier, that the Board recognizes that veterans suffering from undiagnosed illnesses, even if caused by deployment stress, have real medical problems that pose a significant disruption in their lives.

Stress, as it pertains to military deployments, can be defined as the real or perceived imbalance between environmental demands and an individual's capacity to adapt to these requirements. Many scientific studies have established unequivocally that stress can have significant physiological and psychological impact in the human body, contributing to considerable physical illnesses in some patients.

During the Gulf War, deployment stressors varied with any of the following factors: "type of primary duty (engaged in combat, combat support, flight-line support, nonflight support, or multiple duties); traumatic events of combat (came under fire, suffered SCUD attacks or was in ground combat, saw casualties, or suffered injuries that required medical attention); perception of a threat (belief that BW or CW were being used against them); prophylactic treatment for nerve gas exposure (PB); chemical hazards (direct contact with smoke or crude oil from oil well fires in Kuwait, use of insect repellent on a regular basis); adverse working conditions (spent more than 8 hours sandbagging or digging holes in the sand, walked or hiked in the sand); family issues (changed marital status, family member experienced significant health events such as birth of a child, death, hospitalization, severe illness, or miscarriage); and period of deployment."[1] In addition, adverse environmental conditions and harsh living conditions contributed to the stresses of deployment.

Stress should not and cannot be ignored as a potential causative factor for some individuals who exhibit physical illness symptoms following deployment, combat, or combat support operations. There is an unfortunate reluctance on the part of the American public, some members of Congress, and especially among some members of the veterans community to recognize the impact that stress can have on an individual. In fact, during a recent congressional hearing on research into the Gulf War, a prominent individual included in his public testimony a ridicule of the notion that stress played any role in Gulf War illnesses, referring to the head of OSAGWI as being the "captain of the stress team." In addition, many veterans become incensed when they perceive that government officials or scientists attribute their suffering as being "all in their head." These attitudes stem from a misunderstanding of the very real physiological and biochemical impact that stress can have on the human body. Stress can lead to genuine illnesses. No physician or researcher familiar with the effects of stress minimizes the suffering that patients often exhibit. The symptoms are indeed real; they are not imagined and they are not "all in the head." In this regard, the Board concurs with the characterization of stress set forth in the RAND study on stress in the Gulf War:

> The scientific study of stress and its impact on health has made enormous advances in recent years. Unfortunately, these scientific strides have generally not been accompanied by an evolution in popularly held misconceptions about stress. The societal stigma associated with stress as an explanation of poor health and disease has contributed greatly to the politicized

> environment that sometimes characterizes public discourse concerning the health problems suffered by Gulf War Veterans.
>
> Although it is inappropriate to rely upon stress exposure as a default explanation for the myriad health problems reported by Gulf War veterans in the absence of a thorough review of research concerning all plausible causes, we think it equally inappropriate to assume that stress played no role. To do so would ignore what the scientific literature shows about the relationship between stress and health.[2]

Recently, Dr. Harold C. Sox, the chairman of the distinguished Institute of Medicine panel commissioned to review possible Gulf War exposures, stated that the panel of experts wished that Congress had included psychological stress in the list of exposures they should examine. Congress specifically excluded stress as a potential causative factor for review. The Board concurs with Dr. Sox and recommends that combat stress be investigated by the Institute of Medicine with the same academic and scientific rigor that was used to evaluate chemical and/or biological hazards in the war.

The PAC *Final Report* findings were: 1) data from the clinical programs and epidemiological studies indicate stress-related disorders are common components of Gulf War veterans' illnesses, and 2) stigmatization of psychosomatic illness seriously interferes with some veterans seeking care. These findings have created considerable controversy. Many U.S. veterans felt the conclusion that stress could contribute to Gulf War illnesses was neglectful on the part of anyone or any organization that embraced that finding, especially DoD, VA, and the PAC. The Board disagrees with that characterization and strongly recommends that those who dispute the possibility of stress as a contributing factor to physical illness review the voluminous published literature on the subject. Veterans can join forces with the scientific community by giving fair consideration to these scientific observations. Regardless of whether a proposed causative factor is unpopular and/or misunderstood by some veterans, servicemembers, members of Congress, or the general public, policymakers and health care providers should not ignore their duty to these veterans and servicemembers by summarily dismissing potential treatment options or research opportunities that could expand our knowledge of human physiology and improve veterans' health.

Stress and the Psychological and Psychosocial Consequences of Combat and Deployment

A recent RAND Corporation publication[3] commissioned by OSAGWI reviewed stress as it pertains to the Gulf War. It included a review of the scientific literature on stress (301 reference citations), focusing on three sources of evidence: 1) general, non-Gulf War-related studies concerning the link between stress and health problems; 2) available data concerning stresses faced by deployed personnel in the Persian Gulf; and 3) empirical studies bearing directly on the link between stress and health problems experienced by Gulf War veterans. The RAND review concluded: "Although the general scientific literature has implicated stress exposure as a contributing factor in various well-defined conditions, including some health problems experienced by Gulf War veterans, few problems or symptoms are uniquely characteristic of stress exposure.... In sum, the possibility that stress may have either contributed to or exacerbated the health problems of some registry participants (and, by extrapolation, some Gulf War veterans) can neither be ruled out nor proven based upon currently published descriptive registry data."[4] A separate but companion RAND study by David H. Marlowe concluded "...the stress of combat or simply deploying to the theatre of war can have both immediate and long-term physical and psychological consequences. These consequences are similar throughout the history of warfare even though the nature of warfare has changed dramatically. Stress is likely to affect and be affected by many factors synergistically which implicitly leads to the conclusion that it is unlikely that a single

independent cause exists for the undiagnosed symptoms of some Gulf War Veterans.... [T]his paper argues that the search for a single cause of undiagnosed illness is simplistic and, ultimately, doomed to fail. In the area of stress-related concerns, a series of complex and interacting factors are a more likely source of these symptoms. The presentation of psychological pain in the form of physical symptoms is a common event, far more widespread than many realize. Moreover, the undiagnosed illnesses pertaining to service in the Gulf may have been shaped by the culture, which in turn can shape the nature and interpretation of symptoms by the veterans. To be most helpful to the veterans who are suffering from these symptoms, the issue of complexity must be addressed and not abandoned in a search for a single cause."[5]

DoD Initiatives on Stress

In 1994, the U.S. Army, recognizing the deleterious effects that stress can have on deployed and deployable personnel, published a detailed set of manuals on combat and stress. This initiative matched that of the Canadian government, which, after concluding that stress played a major role in the post-Gulf War illnesses experienced by many of its troops, developed effective stress control programs for its forces. In 1999, the Department of Defense codified its stress program by issuing DoD Directive 6490.5, Combat Stress Control (CSC) Programs. The purpose of this directive was to "establish policy and assign responsibility ... for developing CSC programs within the Military Services, the Combatant Commands and Joint Service Operations; [and to] ensure appropriate prevention and management of Combat Stress Reaction casualties to preserve mission effectiveness and warfighting, and to minimize the short- and long-term adverse effects of combat on the physical, psychological, intellectual, and social health of service members." Operationally, this directive has been put into effect for U.S. forces in Bosnia and Kosovo, who have had in-country combat stress control services for deployed members.

In June 2000, DoD conducted a senior leadership conference that focused entirely on stress. More than 150 senior personnel from each of the military services, the Unified Combatant Commands, the Joint Staff, and other interested federal government representatives attended the conference. The Undersecretary of Defense for Personnel and Readiness provided opening and closing remarks for the conference and took ownership of future DoD action on conference recommendations. The conference provided two days of factual, anecdotal, and sometimes emotional presentations that demonstrated the unambiguous role of stress in military operations. Categories and subcategories of operational stress, combat stress, deployment stress, the factors that create and influence stress, separation from families, threat of NBC warfare, fear of injury or death, boredom, periods of anxiety, hostile physical environment, and ethics were all topics for presentation and discussion.

The Board commends DoD for these initiatives and recommends that the newly formed OSAGWIMRMD maintain a close working relationship with the policy development offices at the Department level and the implementing offices for CSC programs at the Service level. The efforts of the Special Assistant should be inclusive and cognizant of the role that stress plays in deployment-related matters. The Board also recommends that the Special Assistant be included in all CSC policy matters, to include implementation of the CSC program and any proposed modifications.

Findings and Recommendations

The Board finds that:

- Stress was a likely contributor to the symptoms of undiagnosed illnesses in at least some Gulf War veterans.
- Stress can have a major influence on the health of military personnel.

- DoD has adequately complied with the PAC recommendation in its *Final Report* concerning stress, stress awareness, and program(s) that address stress.

The Board recommends that:

- DoD and the military services continue to recognize stress and stress amelioration as core concepts for a fit and healthy force.
- The military services incorporate stress awareness and stress training into enlisted and officer training schools and professional development courses.
- The military services heighten and incorporate institutional awareness of this subject into the annual training requirements of the military services-e.g., in the annual U.S. Army mobilization requirements training and comparable training in the other services.
- DoD examine the peer-reviewed scientific literature and conduct appropriate research on stress to enhance deployment health, military health programs, and general military training programs.

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[1] R. Niesenbaum, D. H. Barrett, M. Reyes, W. C. Reeves, Deployment Stressors and a Chronic Multisymptom Illness among Gulf War Veterans," *J Nerv Ment Dis 2000;* 188: 259-65.

[2] G. N. Marshall, L. M. Davis, C. D. Sherbourne, *A Review of the Scientific Literature as It Pertains to Gulf War Illnesses.* Volume 4, *Stress*, (Santa Monica, CA: National Defense Research Institute, RAND, 2000)

[3] Ibid.

[4] Ibid.

[5] D. H. Marlowe, Psychological and Psychosocial Consequences of Combat and Deployment with Special Emphasis on the Gulf War, (Santa Monica, CA: National Defense Research Institute, RAND, (Draft report; publication scheduled for 2000)).

Chapter 8

ONGOING INITIATIVES AND

LESSONS LEARNED FROM THE GULF WAR

In August 1998, the Executive Office of the President, National Science and Technology Council, Office of Science and Technology Policy, issued Presidential Review Directive 5 (PRD-5), *A National Obligation. Planning for Health Preparedness for and Readjustment of the Military, Veterans, and Their Families after Future Deployments*. PRD-5 established broad goals for achieving progress in the area of military health and deployment. On Veterans Day 1998, the President directed the creation of the Military and Veterans Health Coordinating Board (MVHCB) with the specific task to focus on "issues associated with deployment health, research, and communications regarding health risks."[1] Creation of the MVHCB satisfied the specific PAC *Special Report* recommendation that "DoD, DVA, and DHHS should complete the comprehensive risk communication program for Gulf War veterans, as well as for forces deployed in the future; community-based outreach should receive particular focus." The MVHCB was thus an initial step toward institutionalizing goals and objectives for achieving the progress that PRD-5 outlined. Although the MVHCB is an advisory body, it has demonstrated its importance in military deployment and health matters by serving as a focal point for the many activities and programs required by PRD-5 and ongoing within DoD, VA, and DHHS.

In September 2000, the MVHCB conducted a plenary session that reviewed the institutional progress that the government has made in addressing the documented requirements of PRD-5 and the implied requirements of the President in his "leave no stone unturned" directive to investigate the potential causes of veterans' Gulf War illnesses. The following programs and/or topics were discussed:

Periodic Health Assessments (DoD)

The MVHCB proposed the establishment of the Health Enrollment Assessment Review, a DoD standardized instrument for self-reporting health information. While some administrative issues hamper the program (e.g., enrollee noncompliance), the continued development of this data collection program offers the potential to support the life-cycle health record of the military servicemember. The Board recommends that OSAGWIMRMD be an active participant in the development and implementation of the life-cycle military health record.

Deployment Medical Surveillance Assessment Status (DoD)

The Assistant Secretary of Defense for Health Affairs established this program to capture information on hospitalizations, outpatient visits, reportable diseases, HIV results, immunizations, deaths, and other health-related events for the purpose of detecting, characterizing, and countering threats to the health and well-being of military members. The Army Medical Surveillance Activity conducts the program as an element of the Defense Medical Surveillance System. The Board recommends that DoD increase its emphasis on recording deployment data.

Unmet Health Needs of Reservists (DoD)

The expansion of the role of the reserve components in mission performance and the increased utilization of the Presidential Selected Reserve Call-up Authority have resulted in increased demands on

the health care system to provide medical and dental care for reservists. PRD–5 called for development of a plan to satisfy these unmet needs. Section 746 of the National Defense Authorization Act of 1997 directed DoD to conduct a study and report to Congress on the means of improving the provision of uniform and consistent medical and dental care to members of the reserve components. DoD presented its report to Congress in October 1999, and DoD has implemented numerous initiatives to improve health care for reservists before, during, and after deployment. However, funding, mobility of reserve component members, medical data collection, and multiplicity of health care providers are potential issues in the implementation of a comprehensive DoD strategy for the health care of the reservists. The Board recommends that OSAGWIMRMD and the MVHCB support this effort.

Prevention/Treatment of Deployment-Related Stress (DoD)

DoD Directive 6490.5 on Combat Stress Control mandates and outlines the requirements for all Defense agencies. The Board recommends the MVHCB incorporate deployment stress as a major area of emphasis.

Predisposing Psychiatric Problems/Risk Factors (DoD)

Mental disorders clearly affect military readiness. These factors are the second leading cause of hospitalization, the leading cause of inpatient bed days, and the leading medical cause of attrition from the military service. Mental disorders are also the most important cause of medical and occupational morbidity among active duty U.S. military personnel. The Walter Reed Army Institute of Research (WRAIR) will begin research on these factors in Fiscal Year 2001.

Responding to Health Needs/Concerns of Returning Troops (DoD)

PRD-5 mandated a cooperative DoD, VA, and DHHS plan to respond promptly to the health needs and concerns of veterans returning from deployments. DoD established three activities in response to this recommendation:

- The Deployment Health Clinical Center at the Walter Reed Army Medical Center, Washington, D.C.;
- The Deployment Health Research Center at the Naval Health Research Center, San Diego, California; and
- The Deployment Health Surveillance Center at CHPPM, Aberdeen, Maryland.

The Board feels these centers offer great promise for improved understanding of the health consequences of future deployments. OSAGWIMRMD should establish close relationships with these centers.

The Family's Role Related to Deployment (DoD)

Family matters can affect military readiness through their effect on the individual service member and on his or her unit. Continued attention to family housing, unit family support groups during deployments, installation family centers, and DoD school system initiatives indicate the Department's awareness of the importance of family matters, particularly as they relate to deployments.

Current or planned studies in the U.S. Army include:

- Impact of operations tempo on the military family,
- Deployment and stress in the Army Reserve Component, and

- Soldier-family stress contagion in deployable active and reserve component units.

The results of these studies are expected to be applicable to the other military services. The MVHCB and OSAGWIMRMD should ensure the dissemination of any lessons learned to the other military services.

Deployment-related Health Issues/Veterans Health Initiative and Veterans' Health

Programs for Latent Post-war Illnesses (VA)

The VA will establish two Centers for the Study of War Related Illnesses. The four program components of these centers—veterans health issues, outreach and risk communications, clinical care, and education—will focus on development of strategies to minimize illness and injury following future conflicts, including both combat and peace-keeping operations. They will also develop new approaches for improvement of the health care of active duty personnel and veterans with war-related illnesses.

The VA has also initiated the Veterans Health Initiative (VHI), a program that recognizes the connection between certain health effects and military service, allows better documentation of military medical history; prepares health care providers to better serve their veteran patients, and establishes a data base for further study.

Environmental and Occupational Health Programs and Research and Deployment

Occupational/Environmental Health Surveillance (DoD)

PRD-5 recommended DoD possess the capability to collect and assess data associated with anticipated exposures during deployments and to respond to newly identified threats. In 1997, DoD began to develop new risk assessment tools for operational risk management. The National Academy of Sciences has endorsed parts of these plans as a means to provide future capabilities for exposure and risk assessments. The inability to accurately conduct exposure and risk assessments during the Gulf War has inhibited efforts to identify the causes of undiagnosed illnesses.

The Board believes that the complexity of accurate assessment tools and epidemiological standards have inhibited progress in this area of environmental health research. The Board recommends that DoD develop and implement a system for applied toxicological research based on prioritized lists of environmental and occupational substances, as suggested in PRD-5.

Role of Medical Intelligence and Detection of Potentially Hazardous Environmental

Exposures (DoD)

The Armed Forces Medical Intelligence Center provides environmental health intelligence assessments to the preventative medicine community, operational forces, and DoD policy makers. Based on first-hand observation, the Board is satisfied that the lessons of the Gulf War with respect to environmental and health conditions and hazards are being incorporated into operational planning for deployment of our military forces.

Research on Health Effects of Low-Level CW Agents (DoD)

PRD-5 called for a comprehensive effort to identify the health effects of low-level exposures to chemical and biological warfare agents, environmental agents, and other factors. The DoD has historically focused on the lethal effects of CWA. The National Defense Authorization Act of 1999 directed DoD to determine the effects of chronic and low-dose exposures to CWA. Peer review of DoD's plan has resulted in recommendations designed to improve and strengthen the plan. The Board recommends that OSAGWIMRMD and the MVHCB closely monitor the development and resourcing of DoD's plan and make recommendations as appropriate to ensure continued progress in this area.

Interagency Medical Defense Program Against CBW Agents (DoD)

PRD-5 called for establishment of an interagency program for medical defense against chemical and biological warfare agents. In 1994 the military services outlined a Joint Services Agreement plan to coordinate and integrate each respective service's nuclear, biological, and chemical defense efforts. The Chemical and Biological Defense Program and the Joint Service Agreement demonstrate to the Board that the Department is responsive to this PRD-5 recommendation. Fiscal Year 2001 funding is programmed at $17 million, which includes requirements for development, training, and acquisition.[3]

Medical Force Protection: Advance Concepts and Technology (DoD)

This demonstration project responds to the requirement to have the capability to determine exposure to low levels of CBW agents and/or toxic industrial chemicals. DoD is developing a smaller, lighter, simpler, more sensitive device to serve both as a real time alarming chemical detector and as an individual passive chemical sampler for archiving low-level exposures. However, issues such as concept of operations and operational scenario must be addressed before this concept is advanced and tested.[4]

Detecting/Mapping Potential Hazardous Health Exposures and Detecting Potential Biological Agents (DoD)

DoD's Chemical and Biological Defense Program directly responds to the PRD-5 recommendation for development of wide area standoff technologies to detect the battlefield presence of CWA in all physical states. Current upgraded, refined, and developmental systems such as the Fox M93A1 NBC Reconnaissance System, the Joint Service Lightweight Standoff Chemical Agent Detector, the Chemical Warfare Directional Detector, and the M21 Remote Sensing Chemical Agent Alarm demonstrate DoD progress in force health and operational protection in the chemical warfare environment. The Department continues to study low-level exposure scenarios, data analysis, and operational impacts, and the Board commends the Department for meeting these PRD-5 requirements. The Board does not support or recommend hastily conceived, inadequately tested, and quickly fielded approaches in the area of chemical and biological weapons detection and response. While progress may appear to be slow, the Board finds that both the spirit and the intention of the presidential directives are being satisfied with respect to health protection for our forces.

Interagency Health Risk/Research Communication Program (DoD, VA, DHHS)

The MVHCB is participating with the DoD, VA, and DHHS to implement the PRD-5 risk communication requirements. The Board recommends continued support and extension of the MVHCB charter and encourages the respective departments to provide senior level endorsement, participation, guidance, funding, and staffing support to the MVHCB.

Personnel Record Keeping/Tracking (DoD)

DoD fully recognizes the difficulties in coordinating the 1,770 military personnel management systems that collect and maintain information on DoD personnel. The Defense Integrated Military Human Resources System (DIMHRS), the 1,771st system, is being designed to resolve the information collection deficiencies. This system may be operational by 2007. The Board recommends that the MVHCB and OSAGWIMRMD monitor developments in this area.

Documenting Recruits' Health Status and Creation of a Lifetime Health Record (DoD, VA)

These initiatives derive from a critical lesson learned from the Gulf War. Many service member and veteran health issues were not verifiable due to lack of detailed documentation of pre-deployment health status. DoD and VA have recognized this shortcoming and are attempting, through the Recruit Assessment Program, to collect routine baseline health data from U.S. military recruits. The program will establish baseline health information for use in future longitudinal research studies to evaluate health problems among servicemembers and veterans after they leave military service and to address post-deployment health questions. This program requires the continued support of the DoD senior leadership both in concept and in application of resources. The IOM has also endorsed the program concept. Pilot program development and testing are under way at the Marine Corps, Navy, and Air Force recruitment and training commands. The Board recommends that OSAGWIMRMD include the "cradle to grave" health record concept for all U.S. military members in its top-ten priorities list.

Automated System to Collect Pertinent Personnel/Health Data and Data Dictionary for Comprehensive Health Record (DoD and VA)

The military health system is a complicated enterprise consisting of "sustainment" base operations (TRICARE, claims, pharmacy, retiree and dependent health care, contractors, hospitals, clinics), deployment medicine (battlefield medicine, casualty care, medical logistics, command and control, readiness), and an exhaustive list of activities that include integrated record keeping, responsiveness, immunization, research, information system requirements, and health care delivery. Longitudinal information on separating military servicemembers must be transferred to the VA if the veterans' health care system is to avoid the problems that Gulf War veterans experienced. Development of a computer-based patient record that satisfies the "sustainment" and operational base requirements of the military health care system, that simultaneously meets the VA's legal and operational requirements for client records, and that can be integrated with a government-wide computer-based patient record (as directed by the President) represents a monumental undertaking. The Board believes that the ongoing efforts of DoD, VA, and DHHS satisfy both the spirit and the letter of the President's directive and the lessons learned from the Gulf War experience. The Board recommends that the departments continue to apply lessons learned to their program developments in this area, and that the MVHCB be integrated in an ex officio status into the planning activities for the government computerized, multi-department patient record concept.

Conclusion

The Board believes that its recommendation that DoD institutionalize its investigative and historical research into the circumstances and events of the Gulf War, as they relate to the veteran and military service member population, is a critical element in the planning and programming efforts directed at the future health of servicemembers and their families. The implementation of this recommendation and the efforts of the OSAGWIMRMD will have a direct influence on the conduct of future military operations.

The Board observes that most of the above programs are new initiatives in response to the Gulf War, PRD-5, and the President's directive to "leave no stone unturned." Individually, none of these programs will remedy the health problems of Gulf War veterans. However, collectively they represent a substantial beginning to future efforts to address health matters of our servicemembers before, during, and after deployment.

The Board recognizes the critical need for coordination and oversight of the many complex scientific, military, medical, veteran, family, and occupational programs and research activities under way in DoD, VA, and DHHS. The Board recommends that the MVHCB perform that coordinating mission with the assistance, as needed, of OSAGWIMRMD. The Board recommends that the MVHCB remain the focal point for the collective efforts of its chartering sponsors, and that the recommendations of the MVHCB represent a synthesis of the individual departmental efforts.

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[1]President of the United States, Memorandum for the Secretaries of Defense, Veterans Affairs, and Health and Human Services, Subject: Creation of Military and Veterans Health Coordinating Board, Nov 11, 1998.

Chapter 9

FINDINGS, RECOMMENDATIONS, AND OBSERVATIONS

Findings

- The Department of Defense and OSAGWI have worked diligently to fulfill the President's directive to "leave no stone unturned" in investigating the possible causes of Gulf War illnesses.

- DoD has made no effort to deliberately withhold information from the general public or from veterans concerning its investigations or findings related to Gulf War illnesses. On the contrary, DoD has made an extraordinary effort to publicize its findings through the publication of reports and newsletters, public outreach meetings, briefings to veterans and active duty service members, the creation of a toll-free hotline, and the creation of an actively updated website.

- The Board finds that the revised case narrative methodology fully reflects OSAGWI procedures and, more important, provides the most accurate method for assessing the likelihood that chemical warfare agent exposures may have occurred in the Persian Gulf.
- The Board finds that in each of its case narratives, OSAGWI makes assessments regarding the presence of chemical and biological warfare agents that are consistent with available evidence.
- The Board finds that in each of its environmental exposure reports, OSAGWI makes assessments regarding environmental exposures that are consistent with available evidence.
- The Board finds that the Department of Defense appropriately implemented ten of the twelve recommendations contained in the PAC *Special Report.* (DoD was not required to act on two of the recommendations.)

Recommendations

- The Board recommends that OSAGWIMRMD suspend its installation visits until it can devise a more efficient vehicle for conducting town hall meetings while maintaining its informative world-wide web site, 1-800 toll-free operators, and other existing outreach initiatives. The VA should assume the lead for Gulf War illness-focused town hall meetings because veteran questions have centered on that department's services. OSAGWIMRMD should assume a supporting role in such meetings, and the MVHCB should facilitate the transfer of responsibility from DoD to VA for Gulf War illness-focused town hall meetings. OSAGWIMRMD should use those meetings to inform the public about its new responsibilities and use DoD news media, installation visits, and other initiatives to ensure that the active and reserve components of each military service also understand the organization's enhanced mission. (Chapter 2)

- The Board concurs with Dr. Harold Sox, chairman of the recent IOM study on Gulf War exposures, that combat stress should be investigated by the IOM with the same academic and scientific rigor that was used to evaluate other Gulf War exposures whose investigation Congress mandated. (Chapter 7)

- The Board recommends that OSAGWIMRMD be an active participant in the development and implementation of the life-cycle military health record. (Chapter 8)

- The Board recommends that OSAGWIMRMD and the MVHCB develop their mission

requirements in support of meeting the needs of the reserve components. (Chapter 8)

- The Board recommends continued support and extension of the MVHCB concept, charter, and strategic plan and further encourages the respective departments to provide senior level endorsement, participation, guidance, funding, and staffing for the MVHCB. (Chapter 8)

- The Board recommends that the MVHCB and OSAGWIMRMD monitor developments by DIMHRS to resolve deficiencies and duplication in personnel management systems.

  (Chapter 8)

- The Board recommends that DoD and OSAGWIMRMD include the "cradle to grave" health record concept for all U.S. military members in its top-ten priorities list. This should include the computerized health record currently under development. (Chapter 8)
- The Board recommends that DoD, VA, and DHHS continue to apply lessons learned to their efforts to create a comprehensive health record for each veteran. The Board recommends that the MVHCB be integrated into the planning activities directed at the government computerized multidepartmental patient record concept in an ex officio status. (Chapter 8)
- The Board recommends that OSAGWIMRMD and the MVHCB closely monitor the development and resourcing of DoD's research on the health effects of low-level CWA exposures and make recommendations as appropriate to ensure continued progress in this area. (Chapter 8)
- The Board recommends that the MVHCB remain the focal point for the collective efforts of its chartering sponsors and that the recommendations of the MVHCB represent a synthesis of the individual departmental efforts. (Chapter 8)

Observations

- The Department of Defense has acted responsibly, decisively, and in good faith in responding to the President's charge to "leave no stone unturned" in the search for the cause(s) of the undiagnosed illnesses from which some Gulf War veterans still suffer.
- Science alone should determine whether a Gulf War illness or syndrome exists. To date, research has not validated any specific cause of these illnesses, and the general population experiences the same symptoms associated with the undiagnosed illnesses of some Gulf War veterans.

- Government agencies must continue to address the challenging Gulf War veterans issues of medical research, health care delivery, and disability claims processing.

- The Board strongly believes that efforts to fund non-peer-reviewed research projects do not serve the best interests of the nation or its Gulf War veterans. Researchers and clinicians who advocate "alternative" diagnostic and treatment methods, as well as those proposing more conventional approaches, should be encouraged to respond to Requests for Proposal and Broad Area Announcements with well-constructed proposals capable of passing vigorous and independent peer review.
- The Board notes that the executive and legislative branches of government do not have a mechanism to budget and to appropriate funding for health care, rehabilitation, and disability compensation costs that arise after every major conflict or military deployment involving hostile fire. The two branches should develop a budgetary process that automatically incorporates funding for these post-deployment services into the operational costs of a deployment. For example, when the Secretary of Defense estimates to the President the cost of a major operational mission (e.g., Desert Storm/Desert Shield), the estimate should include an allowance for follow-on medical care

and treatment for the U.S. Government participants (military and U.S. Government civilian, not contractors). This cost, when funded, could serve as a mechanism for DoD and VA to provide medical care for veterans and military personnel suffering from illnesses of unknown etiology that were not present or identified prior to the operation or deployment.

- The Board believes that DoD should fully support the Millennium Cohort Study and that the servicemembers selected to participate in the program should cooperate fully. This twenty-year research project will significantly enhance the Federal Government's and the medical community's understanding of the long-term health consequences of military service and facilitate improved clinical care and force health protection for members of the Armed Forces. The study will provide better insight into the possible health effects of service in Bosnia, Kosovo, Southwest Asia, and future deployments and also contribute to VA's development of services that will meet the needs of veterans who participated in overseas operations.
- The Board notes that DoD and VA do not share a core set of questions used in Gulf War illness studies, especially epidemiological studies. The two agencies should consult with the CDC National Center for Health Statistics to design a core set of questions that will result in responses that are comparable with those from other national surveys (i.e., NHIS or NHANES). DoD and VA lose the advantage of comparability of response to survey data from the general population when their questionnaires are not compatible with existing surveys.
- The Board believes that DoD and/or VA should conduct a time series geographical information system analysis from a random sample of deployed Gulf War veterans to identify whether any health outcome clusters occurred in the Kuwaiti Theater of Operations.
- The Board notes that the U.S. Government's haste to respond to media and public expectations for definitive answers to the unintentional release of chemical warfare agents at Khamisiyah stimulated distrust of the government among many veterans and others as inaccurate initial estimates gave way to a flurry of increasingly more accurate, yet ever changing, revisions. The Board strongly believes that the public has the right to receive timely, accurate, and supposition-free information on matters of such grave import. Accordingly, the government must acknowledge when it possesses insufficient information to make an accurate assessment and resist the temptation to make definitive statements in the absence of reliable environmental and meteorological data, in-depth modeling, and careful analysis. Failure to do so will cause some veterans and others to falsely accuse the government of a cover-up and prompt many veterans to attribute their illnesses to exposures that did not occur, could not have occurred, or were too small to cause even transient observable effects.

APPENDIX A

DR. CAM'S DISSENTING COMMENTS

AND THE CHAIRMAN'S RESPONSE

Presidential Special Oversight Board
for Department of Defense Investigations
of Gulf War Chemical and Biological Incidents

December 1, 2000

Chairman
Hon. Warren B. Rudman

Vice Chairman
Hon. Jesse Brown

Board Members
RADM (Ret.) Paul E. Busick
Dr. Vinh Cam
LTG (Ret.) Marc A. Cisneros
CSM (Ret.) David W. Moore
RADM (Ret.) Alan M. Steinman

Executive Director
COL (Ret.) Michael E. Naylon

Deputy Executive Director
LTC (Ret.) Roger Kaplan

Vinh Cam's dissenting remarks on the Final Report

In my three page review (dated November 15, 2000) of the draft Final Report, I had two major concerns: 1) overpraising of Dr. Roestker [sic] and DoD and 2) the Board's statement of stress as causality for Gulf War Illnesses. In the Final Report, although my first concern was addressed by reducing the praising of Dr. Roestker [sic] to two references (pages 10 and 70), the Board's statement on stress has remained unchanged. I thus find it compelling to submit the following dissenting remarks. These remarks should not be viewed as an attack to any individual or party but only a reflection of my empirical observations in an honest effort to strengthen the oversight mission with which I have been entrusted.

The statement that "The Board concludes that stress is likely a primary cause of illness..." in page IX is a blatant misrepresentation. As an individual Board member, I was never asked about the causality of Gulf War Illnesses (GWI). The Board, as a group, was never asked such a question. Furthermore, the Chairman of the Board himself, more than once, stated in public hearings and our own internal meetings that it was not the Board's charter to address the cause of GWI. He had cautioned Board members against making any statement regarding causality of GWI. Given these facts, I was surprised to see such a statement in the Final Report. Although it is acceptable to mention that the review of past research studies has indicated the impact of combat stress - that's why stress is listed among the risk factors - as indicated in Chapter 7, the Board statement of stress as causality is inconsistent with the Board's charter. This statement does not faithfully reflect all Board Members' assessment of GWI issues. Furthermore, it reflects a two-tiered review process. Selected Board members had reviewed and set the tone and direction of this report before it was sent out to all Board members with a short review period given the importance of the report. Not all Board members were given equal weight in shaping the content of the report. It would have been much easier for me to give away my concurrence than writing these remarks. It has also been a common practice for this Board to send out official correspondence in the name of the Board without the full knowledge and input of all Board members.

With regards to the implementation of the Presidential Advisory Committee's recommendation on "DoD...should place a higher priority on addressing pre- and post-deployment surveillance...," it was difficult for me to assess DoD's compliance because I was not given any opportunity to do a field visit, my exposure to this issue was merely limited to DoD presentations to the Board. What could be and couldn't be done by Board members was controlled in an *ad hoc* manner by the Executive Director and/or the Chairman. My requests to attend events organized by Gulf War veterans and to invite veterans to speak at our Board meeting were viewed with suspicion and reluctance and generally denied. There was a deliberate attempt to curtail my contacts with Gulf War veterans. I don't understand how I can effectively assess DoD programs without talking to the very people for whom they are intended.

There is no question that the Board had given a significant technical contribution to the review of OSAGWI Case Narratives. At times though, the Presidential Special Oversight Board (PSOB) acted more like an extension of OSAGWI, a higher level of technical review rather than an Oversight Board in the traditional sense of exerting strict scrutiny over OSAGWI's work. It is beyond the scope of these remarks to address this issue in detail. A Board senior staff scientist had sent out a letter concerning this type of issues to all Board members in September 2000 thus raising a cloud over the independence of PSOB. His hasty and subsequent retraction of his letter has raised more questions in Board members' mind [sic] rather than putting a close to this issue as intended. The lack of full disclosure of the contacts between selected Board members and OSAGWI leadership remains an issue. There was no fire wall between the oversight party and the party being under oversight.

Overall, I think that the Final Report has given a comprehensive account of OSAGWI's activities and its follow-on organization. I also give credit to the Final Report for having identified the resource and budget needs for DoD in coping with and preventing future Gulf War like incidents from happening. However, the tone of certain sections of the report might lead the reader to think that the past stress driven theory of GWI at DoD is being revived by PSOB. A strong and in-depth analytical tone as expected from an oversight report is missing, instead the report is dominated by a contriving effort to advocate stress as "likely a primary cause of illness..." It is regrettable that the Board did not consider my advice in presenting a more objective discussion on stress without losing its educational effect. This might draw more attention to the stress issue and overshadow the importance of a broad range of issues and activities – a good prescription for DoD – that the Board has formulated to help DoD restore its credibility with the public, especially with the veteran community. The Board might have missed its chance in creating a momentum for change in DoD internal organization to more effectively implement the Board's own recommendations. I believe that DoD has no lack of competent and idealistic individuals, but it's a matter of providing appropriate resources to these people to help them achieve their mission. The perception of the Board as not being impartial and lacking wisdom in addressing sensitive issue(s) - be it real or not - might impair the Board's effectiveness.

I wish to point out that despite my above remarks and although I did not experience the level of inclusion as I had expected, the very fact that I had an avenue to offer these dissenting remarks is a tribute to our democratic process. This has allowed me to offer my own lessons learned as a Board member. For future Boards, I recommend that the Executive Director should be selected and his/her performance be rated by Board members themselves. It would also be ideal to rotate

the chairmanship among different Board members. Issues such as "revolving door" should be carefully weighed in selecting the composition of the Board and a fire wall should be established as part of the oversight process. Such actions would help to ensure the integrity of the oversight process. I have observed that DoD's implementation of the PAC's recommendations is slow and uneven, this might probably be due to the fact that DoD is a huge bureaucracy with intense competing interests. I recommend that the implementation of PAC's and/or PSOB's recommendations be instituted as an important rating factor in the performance standards of DoD officials who are in charge of carrying out such a task. I believe that it is desirable to maintain an outside and independent monitoring of DoD programs.

In closing, I wish to express my gratitude to President William Jefferson Clinton for having given me, a non-military person, the opportunity to work on such important matter for our nation. I wish to thank all Board members and staff, all individuals from DoD, VA, HHS, and other organizations for having worked with me during my tenure as a Board member. I also wish to convey my heartfelt thanks to Gulf War and all other veterans for having shared their concerns with me in a genuine manner. Given the complexity of Gulf War Illnesses, I urge Gulf War veterans to start the healing process and move on with their lives, to fully take advantage of new DoD and VA initiatives, and to share their success stories in terms of treatment and/or compensation claims with other fellow veterans who are still struggling with these problems. I would like to end with this inspiring quote that I had read at a war memorial "Less eager than willing, more dutiful than brave, brave when required, democracy's children, they gave their service far from home, and saw they came as victors, not conquerors, in freedom's name" by Robert Pinsky, thirty-ninth poet laureate of the United States. If I may, I would like to add my own verse: "returning victors, more sick than healthy, whatever the cause, regardless of the cost, this nation should take care of them."

Presidential Special Oversight Board for Department of Defense Investigations of Gulf War Chemical and Biological Incidents

December 5, 2000

Chairman Rudman's Response to Vinh Cam's Dissenting Remarks

Chairman

Hon. Warren B. Rudman

Vice Chairman

Hon. Jesse Brown

Board Members

RADM (Ret.) Paul E. Busick

Dr. Vinh Cam

LTG (Ret.) Marc A. Cisneros

CSM (Ret.) David W. Moore

RADM (Ret.) Alan M. Steinman

Executive Director

COL (Ret.) Michael E. Naylon

Deputy Executive Director

LTC (Ret.) Roger Kaplan

I respect Dr. Cam's right to offer a separate opinion. However, I must respond to certain allegations that have no basis in fact.

Dr. Cam expressed strong disagreement with the content as well as the review process of the *Final Report*, a position that no other board member shares. Unlike her six counterparts, Dr. Cam ignored all staff requests to provide input, and she never inquired about the report's status. Two board members did review earlier drafts of the report at their own initiative, and I would have extended the same opportunity to Dr. Cam had she asked. Her two peers did not set the tone and direction of the report. The staff drew on direct board member input as well as board member statements at our many public meetings. The report contains nothing that contradicts her comments at board hearings and other fora.

I strongly object to Dr. Cam's assertion that the *Final Report's* statements on stress constitute a "blatant misrepresentation." She alleges that the other board members and I have concluded that stress is the primary cause of the undiagnosed symptoms that plague many of our Gulf War veterans and cites in support an incomplete passage from the report: "The Board concludes that stress is likely a primary cause of illness." Had Dr. Cam not selectively truncated the statement, one would clearly observe that the Board concluded only that stress is "likely a primary cause of illness in at least some individuals; it is a likely secondary factor in potentiating other causes of undiagnosed illnesses among some other Gulf War veterans" but not a cause in all veterans. This assessment clearly reflects the expansive peer-reviewed literature on the topic, the comments of the chairman of the recent IOM study on Gulf War exposures, and a recent conference that Dr. Cam attended and to which she expressed no objection. She did not offer any advice about providing "a more objective discussion on stress" unless one considers deleting almost all references to stress as being "more objective."

Equally without foundation is her allegation that the Board often "acted more like an extension of OSAGWI." At no time did Dr. Cam ever express to me any concerns about our oversight process or the possibility

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that our independence had been compromised. Similarly, she never questioned the process used to review OSAGWI case narratives and environmental exposure reports, concurring with the staff assessment for each of the 28 publications that the Board examined. I have chosen not to discuss several other concerns about unnamed board members that Dr. Cam raised without having the decency or courage to provide supporting details.

I find no basis in Dr. Cam's assertion that the executive director and I made a "deliberate attempt to curtail [her] contacts with Gulf War veterans." She had access to the mail, the Internet, and the telephone system, and certainly no one on the Board attempted to curtail her contacts with veterans. In fact, staff responded to all of her inquiries on behalf of veterans. Moreover, we invited to present at our hearings every speaker that she identified, and we permitted Gulf War veterans to present testimony even when they had not requested to be included in our program. Dr. Cam attended numerous town hall meetings, and staff informed her and the other board members about various veterans events. On one occasion, Dr. Cam blamed staff for not notifying her about an activist meeting that occurred a day after our April 2000 hearing when, in fact, they had alerted her the previous week.

Dr. Cam expressed disappointment that she "was not given any opportunity to do a field visit" to assess DoD's implementation of pre- and post-deployment health surveillance. However, she never requested to visit a stateside installation from which units were deploying or to which they were returning. Dr. Cam's actual complaint is that she did not represent the Board in either of the two overseas visits to which we were invited. Notably, neither trip involved pre- or post-deployment issues.

My colleague asserts that she "did not experience the level of inclusion as [she] had expected." This should come as no surprise to her considering that she made no attempt to interact with other board members and rebuffed staff efforts to engage her. Dr. Cam remained aloof and uncommunicative throughout the Board's period of operations and has no one to blame but herself for her isolation.

Dr. Cam's lessons learned, especially the recommendation for a rotating board chairmanship, reflect her lack of organizational experience and understanding of group dynamics. No private company or any governmental agency of which I am aware uses a rotating chairmanship for two obvious reasons—efficiency and responsibility. President Clinton clearly recognized this by appointing me as chairman, and I returned his trust by guiding a board that provided him with timely and accurate assessments at minimum cost to the taxpayer.

The Board operated 10% below its allocated budget while resourcing all programmed and unscheduled requirements. Dr. Cam accounted for 47.73% of all board member billings! A remarkable statistic for just one member of a seven-person panel and even more noteworthy for someone who did not produce one paper, share any comments, or volunteer to work on either report to the President. Other board members provided far more extensive contributions at no or little cost to the taxpayer, and I thank them.

APPENDIX B

PRESIDENTIAL DOCUMENTS:

EXECUTIVE ORDER 13075

Federal Register
Vol. 63, No. 36
Tuesday, February 24, 1998

Presidential Documents

Title 3—

The President

Executive Order 13075 of February 19, 1998

Special Oversight Board for Department of Defense Investigations of Gulf War Chemical and Biological Incidents

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the Federal Advisory Committee Act, as amended (5 U.S.C. App.), it is hereby ordered as follows:

Section 1. *Establishment.* (a) There is hereby established the Special Oversight Board for Department of Defense Investigations of Gulf War Chemical and Biological Incidents ("Special Oversight Board"). The Special Oversight Board shall be composed of not more than seven members appointed by the President. The members of the Special Oversight Board shall have expertise relevant to the functions of the Special Oversight Board and shall not be full-time officials or employees of the executive branch of the Federal Government.

(b) The President shall designate a Chairperson and a Vice Chairperson from among the members of the Special Oversight Board.

Sec. 2. *Functions.* (a) The Special Oversight Board shall report to the President through the Secretary of Defense.

(b) The Special Oversight Board shall provide advice and recommendations based on its review of Department of Defense investigations into possible detections of, and exposures to, chemical or biological weapons agents and environmental and other factors that may have contributed to Gulf War illnesses.

(c) It shall not be a function of the Special Oversight Board to conduct scientific research.

(d) It shall not be a function of the Special Oversight Board to provide advice or recommendations on any legal liability of the Federal Government for any claims or potential claims against the Federal Government.

(e) The Special Oversight Board shall submit an interim report within 9 months of its first meeting and a final report within 18 months of its first meeting, unless otherwise directed by the President.

Sec. 3. *Administration.* (a) The heads of executive departments and agencies shall, to the extent permitted by law, provide the Special Oversight Board with such information as it may require for purposes of carrying out its functions.

(b) Special Oversight Board members may be allowed travel expenses, including per diem in lieu of subsistence, to the extent permitted by law for persons serving intermittently in the Government service (5 U.S.C. 5701–5707). The administrative staff for the Special Oversight Board shall be compensated in accordance with Federal law.

(c) To the extent permitted by law, and subject to the availability of appropriations, the Department of Defense shall provide the Special Oversight Board with such funds as may be necessary for the performance of its functions.

Sec. 4. *General Provisions.* (a) Notwithstanding the provisions of any other Executive order, the functions of the President under the Federal Advisory Committee Act, as amended, that are applicable to the Special Oversight Board, except that of reporting annually to the Congress, shall be performed by the Secretary of Defense, in accordance with the guidelines and procedures established by the Administrator of General Services

(b) The Special Oversight Board shall terminate 30 days after submitting its final report.

(c) This order is intended only to improve the internal management of the executive branch and it is not intended, and shall not be construed, to create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity by a party against the United States, its agencies, its officers, or any person.

William J. Clinton

THE WHITE HOUSE,
February 19, 1998.

[FR Doc. 98-4816
Filed 2-23-98; 8:45 am]
Billing code 3195-01-P

THE WHITE HOUSE

WASHINGTON

January 31, 2000

Dear Senator Rudman:

I was pleased to receive a memorandum from Bill Cohen indicating you both would like to have the Presidential Special Oversight Board for Department of Defense Investigations of Gulf War Chemical and Biological Incidents extended to January 20, 2001. The Board has done an excellent job in overseeing DOD's investigative efforts, and I agree the Board should continue in this role.

In accordance with Executive Order 13075, Section 2(e), I hereby direct that the Board's final report be issued no later than December 20, 2000. As provided in Section 4(b) of that Order, the Board shall terminate 30 days after submitting its final report.

I appreciate all you and the Board members are doing on behalf of our veterans.

Sincerely,

Bill Clinton

The Honorable Warren B. Rudman
Chairman
Presidential Special Oversight Board
for Department of Defense Investigations
of Gulf War Chemical and Biological Incidents
1401 Wilson Boulevard, Suite 401
Arlington, Virginia 22209

APPENDIX C

BOARD CHARTER

CHARTER OF THE SPECIAL OVERSIGHT BOARD

FOR DEPARTMENT OF DEFENSE INVESTIGATIONS OF

GULF WAR CHEMICAL AND BIOLOGICAL INCIDENTS

A. BOARD'S OFFICIAL DESIGNATION: Special Oversight Board for Department of Defense Investigations of Gulf War Chemical and Biological Incidents.

B. AUTHORITY: Executive Order No. 13075 dated February 19, 1998.

C. OBJECTIVES, SCOPE OF ACTIVITIES, AND DESCRIPTION OF DUTIES FOR WHICH THE SPECIAL OVERSIGHT BOARD IS RESPONSIBLE: The duties of the Special Oversight Board are solely advisory. The Special Oversight Board shall provide to the President, through the Secretary of Defense, advice and recommendations based on its performance of two principal roles.

1. OVERSIGHT: Independent oversight of the remaining investigations being conducted by the Department of Defense (DoD) with the assistance, as appropriate, of other executive departments and agencies into possible detections of, and exposures to, chemical or biological warfare agents and environmental and other factors that may have contributed to Gulf War Illnesses.

2. EVALUATION: Overall evaluation of the DoD's plan for and progress toward the implementation of the Presidential Advisory Committee's recommendations contained in its Special Report submitted to the President on October 31, 1997.

It shall not be a function of the Special Oversight Board to conduct scientific research. The Special Oversight Board shall review information and provide advice and recommendations on the activities undertaken related to the matters described above. It shall not be a function of the Special Oversight Board to provide advice or recommendations on any legal liability of the Federal Government for any claims or potential claims against the Federal Government. As used herein, Gulf War Illnesses means the symptoms and illnesses reported by the United States uniformed services personnel who served in the Persian Gulf Conflict.

D. OFFICIAL TO WHOM THE COMMITTEE REPORTS: The Special Oversight Board shall report to the President through the Secretary of Defense. The Special Oversight Board shall submit an interim report within nine (9) months of the first meeting and a final report within eighteen (18) months of its first meeting, unless otherwise directed by the President.

E. DURATION AND TERMINATION DATE: The Special Oversight Board shall terminate thirty (30) days after submitting its final report.

F. AGENCY RESPONSIBLE FOR PROVIDING NECESSARY SUPPORT: Financial and administrative support shall be provided by the DoD.

G. MEMBERSHIP: The President appointed seven (7) members to the Special Oversight Board following its establishment. All such appointments shall remain in effect. Special Oversight Board members shall be compensated in accordance with federal law. Special Oversight Board members may be allowed travel expenses, including per diem in lieu of subsistence to the extent permitted by law for persons serving intermittently in the government service (5 U.S.C. 5701-5707).

H. ESTIMATED ANNUAL OPERATING COSTS AND STAFF SUPPORT YEARS: It is estimated that the total cost of operations during the eighteen (18) month period will not exceed $1,000,000 (one million). Full time equivalent staff support years during the period of this Special Oversight Board is expected to be approximately 5 years of effort.

I. NUMBER OF MEETINGS: The Committee shall meet, as it deems necessary, to complete its functions. For voting purposes, a quorum shall consist of no less than 4 Board members.

J. SUBCOMMITTEE(S): To facilitate functioning of the Board, subcommittee(s) may be formed. The objectives of the subcommittee(s) are to provide advice and recommendations to the Board with respect to matters related to the duties of the Board. Subcommittees shall meet as the Board deems appropriate.

K. CHAIRPERSON: The President will designate a Chairperson and a Vice Chairperson from among the members of the Special Oversight Board.

DATE CHARTER FILED: 26 May 1998.

AMENDMENT DATE: 29 July1998.

APPENDIX D

BOARD MEMBER BIOGRAPHICAL INFORMATION

The Honorable Warren B. Rudman, Chairman

Senator Rudman became a partner in the international law firm Paul, Weiss, Rifkind, Wharton, and Garrison after serving two distinguished terms as a U.S. Senator from New Hampshire. The Senator maintains offices with the law firm both in Washington and New York, and on his own in New Hampshire. He was first elected to the Senate in 1980, and was overwhelmingly reelected in 1986.

Born on May 18, 1930, Senator Rudman is a life-long New Hampshire resident. He received a B.S. from Syracuse University in 1952 and served in the U.S. Army as a combat platoon leader and company commander during the Korean War. In 1960 he received his LL.B. from Boston College Law School. Senator Rudman began his career practicing law in his hometown of Nashua. In 1970, he was appointed Attorney General of New Hampshire. He later joined the Manchester, N.H., law firm Sheehan, Phinney, Bass, and Green, where he currently maintains an office part-time.

During his 12 years in the Senate, Senator Rudman established a record of independence by refusing to accept out-of-state political action committee donations. Perhaps his best-known accomplishment came in 1985, when he co-authored the Gramm-Rudman-Hollings deficit reduction law, a historic step that imposed discipline and accountability on the chaotic budget process in order to reduce the federal deficit.

In December 1986, Senator Rudman was appointed to serve as Vice-Chairman of the Senate Select Committee investigating arms transfers to Iran. He also served on the Ethics Committee and presided over numerous investigations, including the Keating Five. Senator Rudman served on the Senate Appropriations Committee, and was active on the Subcommittees on Defense and Commerce, Justice, State, and the Judiciary, where he served as Ranking Republican. While supporting a strong military, he actively opposed expensive weapons that were not cost effective. He also served on the Intelligence Committee, the Governmental Affairs Committee, and the Permanent Subcommittee on Investigations.

Senator Rudman's inside account of his career in the Senate is detailed in his book, *Combat: Twelve years in the U.S. Senate*, published by Random House in 1996.

In the fall of 1993, President Clinton appointed Senator Rudman as a member of the President's Foreign Intelligence Advisory Board; he now serves as Chairman. In addition, he was appointed by the President to serve as Vice Chairman of the Commission on Roles and Capabilities of the U.S. Intelligence Community. He also serves on the Board of Trustees of Boston College, Valley Forge Military Academy, the Brookings Institution, and the Aspen Institute. He is also a member of the Senior Advisory Committee of the Institute of Politics and the John F. Kennedy School of Government at Harvard. Warren B. Rudman is founding co-chairman of the Concord Coalition.

The Honorable Jesse Brown, Vice Chairman

The Honorable Jesse Brown, of Chicago, Illinois, served in President Clinton's Cabinet as Secretary of the Department of Veterans Affairs from 1993 to 1997. As Secretary, he undertook an aggressive

research initiative to determine the causes of the illnesses of Persian Gulf War Veterans, and was successful in aiding the enactment of laws authorizing payment to those Veterans' undiagnosed illnesses. Mr. Brown grew up in Chicago, where he was an honors graduate of Chicago City College. He enlisted in the Marine Corps in 1963, and was wounded in combat in Vietnam in 1965. Following military service, he spent his professional career with the Disabled American Veterans, serving as their Executive Director from 1989 to 1993.

Rear Admiral (Retired) Paul E. Busick, U.S. Coast Guard

Paul E. Busick is a native of Lindenhurst, New York, and a graduate of the U. S. Coast Guard Academy. He holds a Master of Science degree in Industrial Administration from Purdue University and is a graduate of the National War College in Washington, D. C.

Rear Admiral Busick is an aviator and has commanded the Air Station San Francisco, California, and the Aviation Training Center, Mobile, Alabama. He has served as Deputy Chief of the Office of Law Enforcement and Defense Operations, U. S. Coast Guard Headquarters. Following his promotion to Rear Admiral, he was appointed as Director, Office of Intelligence and Security, U. S. Department of Transportation (DOT). He served as the Secretary of Transportation's National Security Advisor with policy responsibility for security measures in all modes of transportation. In 1996, he joined the National Security Council as a Special Assistant to the President and Senior Director for Gulf War Illnesses. Admiral Busick retired from active service in June 1998.

In October 1998, Governor James B. Hunt, Jr. named Admiral Busick as President and Executive Director of North Carolina's Global TransPark Authority.

Rear Admiral Busick's military awards include the Defense Distinguished Service Medal, the Coast Guard Distinguished Service Medal, and the Legion of Merit. He was awarded the DOT Distinguished Service Award and the Federal Aviation Administration's Extraordinary Service Medal, the highest departmental accolade for contributions to civil aviation.

Rear Admiral Busick is married to Sarah Mullikin of West Lafayette, Indiana. He has three sons, Paul, Jr., Don and Thomas.

Dr. Vinh Cam

Dr. Vinh Cam, of Greenwich, Connecticut, is a consultant working with companies and non-governmental organizations on airborne toxins, hazardous waste management and environmental and occupational health matters. Among her professional work experiences, Dr. Cam was Adjunct Professor of Management Science at Pace University, did clinical research on autoimmune diseases at Rockefeller University and worked in the Environmental Protection Agency for 11 years, developing an expertise in air toxics and health risk assessments. Dr. Cam has also participated in medical missions to Vietnam, in the Commission on the Status of Women for the Fourth World Conference on Women in Beijing, the World Summit for Social Development in Copenhagen and the International Conference on Population and Development in Cairo. She has a Doctorate in Cellular Immunology/Immunotoxicology from New York University, and a Masters in Business Administration from Bernard M. Baruch College.

Lieutenant General (Retired) Marc Anthony Cisneros

Marc Anthony Cisneros, of Premont, Texas, is President of Texas A & M University—Kingsville Campus, and a retired Lieutenant General, United States Army. He entered the Army as a 2nd Lieutenant

in 1961, and over the course of 34 years had a number of assignments throughout the United States and abroad, including two tours in Vietnam. He served as Commanding General, US Army South (Republic of Panama) during Operation Just Cause in 1989-1990. From 1992 to 1994, he was the Deputy Inspector General for Investigations and Oversight in the Office of the Secretary of the Army before his service as Commanding General of the Fifth United States Army, and subsequent retirement in 1996. In 1997, he was named one of the "100 Most Influential Hispanics" by *Hispanic Business Magazine.* General Cisneros graduated from St. Mary's University in San Antonio.

Command Sergeant Major (Retired) David W. Moore

David W. Moore, of Aurora, Illinois, was appointed County Coroner, Kane County, Illinois, in February 1999. Previously, he served as Lead Criminal Investigator assigned to the State Attorney's Office and a Kane County Deputy Sheriff. In his 28 years in law enforcement, Mr. Moore has had a wide variety of assignments, including criminal investigations and commanding the "bomb squad". In May 1998, Mr. Moore retired as a Command Sergeant Major from the United States Army Reserve with 35 years of military service. He was on active duty in both Vietnam and the Persian Gulf War, and has received multiple decorations for his service. Mr. Moore received his Bachelor of Arts in Criminal/Social Justice from Lewis University, Romeoville, Illinois.

Rear Admiral (Retired) Alan M. Steinman

Alan M. Steinman, of Dupont, Washington, is a retired Rear Admiral with the United States Public Health Service and the U.S. Coast Guard, and the former Surgeon General of the Coast Guard. For his contributions to health care in this capacity, Admiral Steinman received the United States Armed Forces Distinguished Service Medal. He is an expert on the management of wilderness and environmental emergencies, and has published and presented extensively on the topic. Over the course of his 25-year Coast Guard career, Admiral Steinman developed and conducted numerous testing procedures for survival under hostile circumstances. He also established a Wellness Program for Coast Guard beneficiaries and employees. Admiral Steinman received a Bachelor of Science from the Massachusetts Institute of Technology, a Masters of Public Health from the University of Washington, and a Doctor of Medicine degree from Stanford University. He currently works as a consultant in occupational and environmental medicine.

FORMER BOARD MEMBER

Admiral Elmo R. Zumwalt, Jr. (1920-2000)

Elmo R. Zumwalt, Jr., of Arlington, Virginia, was a retired Admiral with the United States Navy and a former member of the Joint Chiefs of Staff. Born on November 29, 1920 in San Francisco, California, Admiral Zumwalt graduated from the United States Naval Academy and became both the youngest four-star admiral in history and the youngest person ever to serve as Chief of Naval Operations. He was Commander of United States Naval Forces in Vietnam from 1968 to 1970, where he served with his son, Naval Officer Elmo Zumwalt III. In 1988, Admiral Zumwalt's son died of cancer related to contact with Agent Orange in Vietnam. *My Father, My Son* was co-authored in 1986, by Admiral Zumwalt and his late son, and is an account of their Vietnam experiences and the tragedy that resulted. Admiral Zumwalt retired from the Navy in 1974 and served as a member of the President's Foreign Intelligence Advisory Board. He was a Director of a number of corporations, including Dallas Semiconductor, Magellan Aerospace and NL Industries. He was a founder of and served as Chairman of the Marrow Foundation.

He also was a member of the U.S. Navy Memorial Foundation, the Ethics and Public Policy Center, the Hudson Institute, and the Council of Foreign Relations. In 1998, the President of the United States awarded Admiral Zumwalt the Medal of Freedom, the nation's highest civilian honor.

Admiral Zumwalt passed away on January 2, 2000. He was a patriot and a gentleman.

APPENDIX E

STAFF MEMBER BIOGRAPHICAL INFORMATION

Michael E. Naylon, Executive Director

Mr. Naylon is a retired US Army Reserve Colonel with 30 years of commissioned service, of which 15+ years were on full time active duty. Following assignments at Headquarters, Department of the Army and US Southern Command (Panama) during Operation Just Cause, he spent his last 4+ years of active duty with The Joint Staff in the J-3 Operations Directorate, where he was a JCS Crisis Action Team Chief in the National Military Command Center during Operations Desert Storm/Desert Shield as well as the Haiti and Rwanda crises. He left active duty in 1995, joined the National Association of Retired Federal Employees, and then served briefly as National Executive Director of the American Veterans of WWII, Korea and Vietnam (AMVETS). Mr. Naylon is a graduate of John Carroll University, Cleveland, Ohio. He holds a Masters of Business Administration degree from Marymount University, Arlington, VA and is a graduate of the US Army War College. Mr. Naylon is married to Beverly Marzano of Rochester, NY. They have two daughters, Colleen Burgos and Michelle Faber, and three grandchildren.

Roger Kaplan, Deputy Executive Director

Mr. Kaplan retired from the U.S. Army as a Lieutenant Colonel in 1998 after more than 22 years of active duty. He served in field artillery units at Schofield Barracks, Hawaii; Fort Knox, Kentucky; Cakmakli, Turkey; and Fort Drum, New York. Mr. Kaplan also taught military history at West Point and served as the Army's Chief of Historical Services. In addition, he directed public affairs and protocol operations for an international peacekeeping force in Egypt, and he completed his military service as the Secretary of Defense's veterans outreach director. Mr. Kaplan is a graduate of the U.S. Military Academy and the U.S. Army Command and General Staff College. He received a Masters in History from the University of Michigan and a Masters of Business Administration from Virginia Tech. Mr. Kaplan is married to Sheree Brown, and they have a daughter, Sarah.

STAFF MEMBER BIOGRAPHICAL INFORMATION (Cont'd)

David C. Edman, PhD, Director of Administration/Medical Analyst

Dr. Edman retired from the U.S. Navy as a Commander in 1999 after more than 28 years of active duty. He served in a variety of medical research assignments both in the U.S. and overseas, public health microbiology support to the Atlantic Fleet, and in Navy and DoD medical programs management. He served as the bacteriologist at both the U.S. Naval Medical Research Units No. 3, Cairo, Egypt and No. 2 Detachment, Jakarta, Indonesia. He subsequently appointed the Officer in Charge and Director of the Jakarta Detachment from 1985 to 1987. He also served as the Deputy Special Assistant for the Navy/Marine Corps HIV Program from 1990 to 1996. His final active duty assignment was as Staff Director, Interagency Support Office, Persian Gulf Veterans Coordinating Board under detail from the Deputy Assistant Secretary of Defense for Health Affairs (Clinical and Program Policy). Dr. Edman is the author and co-author of many articles in peer-reviewed publications, numerous presentations before

scientific meetings, and several articles in Navy technical publications. His scientific interests are emerging infectious diseases and rapid diagnosis of infections. He received his Doctor of Philosophy in Bacteriology from Washington State University, a Master of Science in Microbiology and Public Health from the same institution, and a Bachelor of Science in Microbiology from the University of Illinois. Dr. Edman is married to Marylou Balyozian and they have a daughter, Nissa.

Michael A. Hamilton, Chemical Analyst

Mr. Hamilton has served 18 years as a United States Army Reserve Officer, with almost 6 of those years being served on active duty. His primary specialty is 74A, Chemical Officer, and his secondary specialty is 52A, Nuclear Weapons Officer. His assignments have included serving as a Nuclear, Biological, Chemical Element Director for HQ VII Corps, Brigade Chemical Officer for the 17th Field Artillery Brigade, Nuclear and Chemical Surety Officer for HQ TECOM, Radiological Defense Officer for FEMA, and Nuclear Weapons Officer for the 162nd R&D (SDI). Mr. Hamilton received his BA from the University of Central Florida. He is also a graduate of the USMC Command and Staff College, USA Logistics Management College, USA Chemical Officer Advanced Course, USMC Amphibious Warfare School, USA Nuclear Weapons Management Course, DOD Nuclear Accident/Incident Response and Assistance Course, USA NBC Defense Officer Course, British Army NBC Defense Officer Course, and the USA Ordnance Officer Basic Course. He is also a Fellow of the American College of Forensic Examiners and a Board Certified Forensic Examiner. Mr. Hamilton has been married to Kristina for almost 7 years and they have a son, Andrew.

Sandra M. Robinson, Administrative Assistant

Sandra M. Robinson serves as administrative assistant to the Executive Director of the Special Oversight Board for Department of Defense Investigations of Gulf War Chemical and Biological Incidents, a position she has held since September 8, 1998.

Sandra P. Simpson, Program Support Analyst

Ms. Sandra P. Simpson, a native Californian, now serves as the Program Support Analyst to the Executive Director of the Special Oversight Board for the Department of Defense Investigations of the Gulf War Chemical and Biological Incidents.

FORMER STAFF

Thomas Emsley (1998-1999)

Stuart Froehling (1998)

Erick K. Ishii, PhD (1998-2000)

Rebecca Love (1998-1999)

Terrance Lynch (1998-1999)

William H. Taylor, PhD (1998-2000)

APPENDIX F

KEY GULF WAR ILLNESS STUDIES and REPORTS

Executive Branch

Presidential Advisory Committee on Gulf War Veterans' Illnesses

Reports: *Interim Report* (February 1996)

Final Report (December 1996)

Supplemental Letter (April 1997)

Special Report (October 1997)

Department of Defense

Defense Science Board

Report of the Defense Science Board Task Force on Persian Gulf: War Health Effects (June 1994)

Persian Gulf Illness Investigation Team (PGIIT)

Office of the Special Assistant for Gulf War Illnesses (OSAGWI)

Reports: Available at www.GulfLINK.gov

(Case Narratives)

11th Marines 5 November 1998

Al Jaber Air Base 25 September 1997

Al Jubayal, Saudi Arabia 13 August 1997

An Nasiriyah ASP 13 January 2000

Camp Monterey 13 January 2000

Cement Factory 15 April 1999

Czech-French Detections 4 August 1998

Fox Alerts in the 24th Infantry Division 24 February 2000

Fox Detections in an ASP/Orchard 25 September 1997

Injured Marine 21 March 2000

Khamisiyah 14 April 1997

Kuwaiti Girls School 19 March 1998

Possible Chemical Agent on SCUD Missile Sample 27 July 2000

Possible Mustard Release at Ukhaydir Ammunition Storage Point

27 July 2000

Reported Mustard Agent Exposure Operation Desert Storm

28 August 2000

Tallil Air Base, Iraq 25 May 2000

US Marine Corps Minefield Breaching 25 May 2000

(Environmental Exposure Reports)

Chemical Agent Resistant Coating (CARC) 27 July 2000

Depleted Uranium 4 August 1998

Oil Well Fires 5 November 1998

Particulate Matter 27 July 2000

(Information Papers)

Air Campaign: Modeling and Simulation in the Planning of Attacks on

Iraqi Chemical and Biological Warfare Targets 24 February 2000

Fox NBC Reconnaissance Vehicle 29 July 1997

Inhibited Red Fuming Nitric Acid (IRFNA) 13 August 1999

Iraq's Scud Ballistic Missiles 27 July 2000

M-256 Series Chemical Agent Detector Kit 13 August 1999

M8A1 Automatic Chemical Agent Alarm 13 November 1997

Military Medical Record Keeping During and After the Gulf War

13 August 1999

Medical Surveillance During Operations Desert Shield/Desert Storm

13 November 1997

Mission Oriented Protective Posture (MOPP) and Chemical Protection

13 November 1997

(Close out Reports)

ARCENT 21, March 2000

Possible Post War Use of Chemical Warfare Agents Against Civilians

by Iraq, 25 May 2000

Retrograde Equipment, 21 March 2000

Water Use, 24 February 2000

RAND, National Defense Research Institute

Reports: *A Review of the Scientific Literature As It Pertains to Gulf War Illnesses*

Volume 2. Pyridostigmine Bromide. BA Golomb

Volume 4. Stress. GN Marshall, LM Davis, and CD Sherbourne

Volume 6. Oil Well Fires. DM Spektor

Volume 7. Depleted Uranium. NH Harley, EC Foulkes, LH Hillborne,

A Hudson, CR Anthony

Military Use of Drugs Not Yet Approved by the FDA for CW/BW Defense:

Lessons From The Gulf War. RA Rettig.

Psychological and Psychosocial Consequences of Combat and Deployment

with Special Emphasis on the Gulf War. DH Marlowe

Department of Health and Human Services

Report: *The Health Impact of Chemical Exposures During the Gulf War: A Research Planning Conference*. February 28 to March 2, 1999.

Department of Veterans Affairs

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Persian Gulf Expert Scientific Panel (February 1994)

Central Intelligence Agency/Intelligence Community

Persian Gulf War Illness Task Force (1997)

Reports: Numerous; see www.GulfLINK.gov or www.CIA.gov for more information

Reports: *Intelligence Related to Possible Sources of Biological Agent Exposure During the Persian Gulf War. August 2000*

Intelligence Related to Possible Sources of Radioactive Contamination During the Persian Gulf War. July 2000

Update on Potential Mustard Agent Release at Ukhaydir Ammunition Storage Depot. 4 September 1997

Maymunah Munitions Depot. 4 September 1997

16 Suspect CW/BW Storage Sites. 4 September 1997

Modeling the Chemical Warfare Agent Release at the Khamisiyah Pit. 4 September 1997

17 Suspect CW/BW Storage Sites. 30 July 1997

Status of Director of Central Intelligence Persian Gulf War

Illnesses Task

Force Support to Efforts for Modeling the Chemical Release from the

Khamisiyah Pit Area. 25 April 1997

Khamisiyah: A Historical Prospective on Related Intelligence, 9 April 1997

CIA Report Intelligence Related to Gulf War Illnesses. 2 August 1996

Persian Gulf Veterans Coordinating Board (estab. January 1994; DoD/VA/DHHS)

Reports: *Annual Reports to Congress*

Federally Sponsored Research on Gulf War Veterans Illnesses for 1996,

May 1997

Federally Sponsored Research on Gulf War Veterans Illnesses for 1997,

March 1998

Federally Sponsored Research on Gulf War Veterans Illnesses for 1998,

June 1999

National Institutes of Health Technology Assessment Workshop Panel (April 1994) (DoD/DHHS/VA/EPA)

The Health Impact of Chemical Exposures During the Gulf War: A Research Planning Conference
(February 28 – March 2, 1999)

Legislative Branch

Senate Committee on Banking, Housing, and Urban Affairs

Report: *The Riegle Report, U.S. Chemical and Biological Warfare-Related Dual Use*

Exports to Iraq and Their Possible Impact on the Health Consequences of the Gulf War (May 25, 1994)

Senate Committee on Veterans' Affairs

Report: ***Report of the Special Investigation Unit on Gulf War Illnesses*** *(1998)*

House Committee on Government Reform

Report: *Gulf War Veterans' Illnesses: VA, DoD Continue to Resist Strong Evidence Linking Toxic Causes to Chronic Health Effects* (1997)

General Accounting Office

Report: see **www.gao.gov** for more information

Reports: *Gulf War Illnesses: Management Actions Needed to Answer Basic Research Questions. Jan 2000*

Gulf War Illnesses: Basic Questions Unanswered. Feb 2000

Gulf War Illnesses: Understanding of Health Effects from Depleted Uranium Evolving but Safety Training Needed. March 2000

Gulf War Illnesses: Procedural Reporting Improvements are Needed in DoD's Investigation Processes. Feb 1999

Gulf War Illnesses: Questions about the Presence of Squalene Antibodies in Veterans Can be Resolved. March 1999

Medical Readiness: DoD Faces Challenges in Implementing Its Anthrax Vaccine Immunization Program. October 1999

VA Health Care: Better Intergration of Services Could Improve Gulf War Veteran's Care. August 1998

Gulf War Veterans: Limitations of Available Data for Accurately Determining the Incidence of Tumors. May 1998

Veterans' Benefits: Improvements Made to Persian Gulf Claims Processing. May 1998

VA Health Care: Persian Gulf Dependents' Medical Exam Program Ineffectively Carried Out. March 1998

Gulf War Illnesses: Federal Research Strategy Needs Reexamining. Feb 1998

Gulf War Illnesses: Research, Clinical Monitoring, and Medical Surveillance. Feb 1998

Gulf War Illnesses: Public and Private Efforts Relating to Exposures of U.S. Personnel to Chemical Agents. Oct 1997

Gulf War Illnesses: Reexamination of Research Emphasis And Improved Monitoring of Clinical Progress Needed. June 1997

Operation Desert Storm: Evaluation of the Air Campaign. June 1997

VA Health Care: Observations on Medical Care Provided to Persian Gulf Veterans. June 1997

Veterans' Compensation: Evidence Considered in Persian Gulf War Undiagnosed Illness Claims. May 1996

Operation Desert Storm: Health Concerns of Selected Indiana Persian Gulf War Veterans. May 1995

National Academy of Sciences

Institute of Medicine

Reports: *Health Consequences of Service During the Persian Gulf War: Initial Findings and Recommendations for Immediate Action* (1995)

Health Consequences of Service During the Persian Gulf War:

Recommendations for Research and Information Systems

(1996)

Adequacy of the Comprehensive Clinical Evaluation Program:

Nerve Agents (1997)

Adequacy of the Comprehensive Clinical Evaluation Program:

A Focused Assessment (1997)

Adequacy of the DVA Persian Gulf Registry and Uniform Case Assessment Protocol (1998)

Measuring the Health of Persian Gulf Veterans: Workshop Summary (1998)

Veterans at Risk: The Health Effects of Mustard Gas and Lewisite (1993)

International

United Nations Special Commission (UNSCOM)

(Semi-Annual Reports to the Security Council)

Reports: S/1999/1037 of 08/10/1999 Eighth report under resolution 1051 (United

Nations Security council Resolution 1051, Approval of Export/Import

Monitoring Mechanism for Iraq)

S/1999/401 of 09/04/1999 Seventh report under resolution 1051.

S/1999/920 of 06/10/1998 Sixth report under resolution 1051.

S/1998/332 of 16/04/1998 Fifth report under resolution 1051.

S/1997/774 of 06/10/1997 Fourth report under resolution 1051.

S/1997/301 of 11/04/1997 Third report under resolution 1051.

S/1996/848 of 11/10/1996 Second report under resolution 1051.

S/1996/258 of 11/04/1996 First report under resolution 1051.

Great Britain

Gulf Veterans' Illnesses Unit (GVIU)

Reports: see www.mod.uk/index.php3?page=955

Canada

Reports: *Health Study of Canadian Forces Personnel Involved in the 1991 Conflict*

in the Persian Gulf (1998)

Czech Republic

Reports: *The Czechoslovak Chemical Unit in the Persian Gulf and Examination*

Results Concerning a Potential Use of Combat Toxic Agents (1997)

The Medical Committee Report: A Project of the Ministry of Defense

Concerning Participants in the Persian Gulf War (1997)

APPENDIX G

CASE NARRATIVE MATRIX

OSAGWI Product	Internal Review	Meetings w/ OSAGWI	Final Review	Report to Board	Board Approval/ Sent to OSAGWI
Depleted Uranium	12/15/98	12/17/98	1/6/99	1/8/99	2/19/99 2/19/99
Czech/ French Detections	1/6/99	1/8/99 1/15/99	1/22/99	2/22/99	3/12/99 3/16/99
Oil Well Fires	1/15/99	1/20/99	3/5/99	3/8/99	4/1/99 4/2/99
Kuwaiti Girls School	1/25/99	1/29/99	2/16/99	2/22/99	3/15/99 3/16/99
Mustard Agent Exposure	2/17/99	2/23/99	4/20/99	4/21/99	5/20/99 5/21/99
An Nasiriyah	3/4/99	3/5/99	4/20/99	4/21/99	5/20/99 5/21/99
11th Marines	1/8/99	1/12/99 2/3/99	6/9/99	6/15/99	9/9/99 10/5/99
Tallil Air Base	3/4/99	3/5/99	4/20/99	4/21/99	5/20/99 5/21/99

Camp Monterey	4/13/99	Not held	4/20/99	4/21/99	5/20/99 5/21/99
Al Jaber Air Field	7/11/00	8/16/00	8/17/00	8/18/00	9/5/00 9/11/00
ASP Orchard	10/5/99	10/14/99 6/29/00	6/29/00	7/7/00	7/21/00 7/26/00

OSAGWI Product	Internal Review	Meetings with OSAGWI	Final Review	Report to Board	Board Approval/ Sent to OSAGWI
Scud Missile Sample	9/17/99	Not held	9/29/99	10/1/99	11/11/99 11/16/99
Cement Factory	8/18/99	8/25/99 8/31/99	10/4/99	10/5/99	11/11/99 11/16/99
Camp Monterey II	1/18/00	Not held	2/10/00	3/1/00	4/18/00 4/20/00
An Nasiriyah II	1/18/00	2/3/00	2/10/00	3/1/00	4/18/00 4/20/00
CARC	3/3/00	3/9/00	3/16/00	3/22/00	5/1/00 5/2/00
Fox Detections in 24thInf Div	3/14/00 5/30/00	6/7/00	6/8/00	6/20/00	6/23/00 6/29/00
Injured Marine	4/17/00	4/20/00	4/24/00	5/1/00	6/01/00 6/5/00

Marine Breaching II	**6/26/00**	**6/29/00**	**6/29/00**	**7/7/00**	**7/21/00** **7/26/00**
Tallil Air Base II	**6/7/00**	**Not held**	**6/8/00**	**6/20/00**	**6/23/00** **6/29/00**
Ukhaydir	**8/11/00**	**Not held**	**8/17/00**	**8/18/00**	**9/5/00** **9/11/00**
CARC II	**8/2/00**	**Not held**	**8/8/00**	**8/11/00**	**9/1/00** **9/11/00**
SCUD Missile Sample II	**8/2/00**	**Not held**	**8/8/00**	**8/11/00**	**9/1/00** **9/11/00**
Oil Well Fires II	**10/13/00**	**10/26/00**	**10/26/00**	**10/26/00**	**11/8/00** **11/9/00**

OSAGWI Product	Internal Review	Meetings with OSAGWI	Final Review	Report to Board	Board Approval/ Sent to OSAGWI
Cement Factory II	10/6/00	Not held	10/13/00	10/26/00	11/8/00 11/9/00
An Nasiriyah III	10/6/00	Not held	10/13/00	10/26/00	11/8/00 11/9/00
Mustard Exposure II	10/30/00	Not held	11/6/00	11/7/00	11/17/00 11/20/00
Fox Detections in 24th Inf Div II	10/30/00	Not held	11/6/00	11/7/00	11/17/00 11/20/00

Case narratives and other products are assigned to two analysts – one lead and the other second reader – who analyze the reports, based on a set standard set of criteria. During this period analysis team members will meet with OSAGWI and other relevant officials for fact-finding and questioning. Once the analysis is completed other team members review the product. After the team accepts the analysis then a formal meeting is held with OSAGWI to discuss questions, findings and issues of concern. Finally, the staff will present a formal report to the Board, which will include key findings, conclusions and recommendations.

APPENDIX H

Monthly Events and Meetings

Following the November 1998 session, in response to Chairman Rudman's direction, the Board immediately began a schedule of informational meetings, hosting a wide range of subject matter experts. These meetings are designed to inform both Board members and staff on studies, research and other activities intended to better understand governmental investigations of possible Gulf War chemical warfare incidents and related Gulf War health issues.

The Board actively solicited the participation of veterans' organizations in its activities and ensured that the VSO's have been invited observers to the Board's review sessions. Although the Board has not been required to announce these meetings in the Federal Register (no quorum being present), outside observers have been invited to most of these sessions. The Board process has been one of openness. In accordance with FACA, the Board made no decisions during these meetings.

August 1998

The Board met with the Assistant Secretary of Defense for Health Affairs; visited the Walter Reed Army Hospital Gulf War Health Center Specialized Care Program; reviewed DoD's Comprehensive Clinical Evaluation Program; received briefings from the Department of Veterans Affairs; received an overview presentation of the Persian Gulf Veterans Coordinating Board Research Working Group; and received a briefing from the Joint Staff (J-4) on force health protection.

September 1998

Representatives from the Veterans of Foreign Wars, American Legion, and National Gulf War Resource Center were invited to present concerns to Board members Mr. Dan Fahey, National Gulf War Resource Center and author of a non-peer reviewed report on DU, was invited to summarize his views for Board members; Board and staff members traveled to Fort Detrick, Maryland, for presentations by CHPPM; and a Board member represented the Chairman at a White House interagency working group on Gulf War illnesses.

A Board member was briefed on the progress of the DoD toward electronic capture of information on individual service members in the "Personal Information Carrier." Following this meeting, Board member Zumwalt contacted the Chairman of the Joint Chiefs of Staff, General Henry H. Shelton, urging that the military establish a task force to explore the integration of Global Positioning System and the PIC to record the battlefield location of soldiers, sailors, airmen, and marines. This recommendation, based on the continuing difficulty in identifying individual (vs. by unit, UIC) personnel movements in a theater of operations, was forwarded to the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence

January 1999

Update on Rand Research Activities related to Stress and the Rand Literature Review Process.

February 1999

Updates from the Joint Staff on Deployment Health Surveillance and Readiness, OSD Health Affairs update on illnesses among Gulf War veterans, update on CHPPM DU studies

March 1999

A general update on case narrative status was given by OSAGWI, followed by an overview of the Preliminary Analysis Team and how the case identification process is implemented by OSAGWI.

April 1999

The Board received an overview presentation on DoD Efforts to Address Potential Hazards from Exposure to Low Levels of Chemical Warfare Agents from the Office of the Deputy Assistant to the Secretary of Defense for Chemical and Biological Defense.

May 1999

OSAGWI updated the Board on its Lessons Learned Directorate, representatives from the Canadian and British Armed Forces updated Board members on each country's efforts at investigative activity on Gulf War illnesses, and the Board monitored OSAGWI's town hall meeting and unit briefings during the latter's installation visit to Fort Stewart, GA.

June 1999

The Board held a special session and received a presentation from Dr. Robert Haley of the University of Texas, Department of Internal Medicine, on his medical research and findings as related to Gulf War veterans and a neurotoxic brain injury hypothesis. The Board invited scientific experts from Johns Hopkins University and various governmental agencies (VA, DoD, DHHS) to the presentation, and several recommendations were offered by those scientific experts. The Board's interest was in the findings of the research and the relationship of those findings to ongoing DoD research into Gulf War illnesses. Although the research findings are not published, they offered no corroborated evidence to support the unraveling of the Gulf War illness issue. The scientists present did recommend independent research to replicate the findings presented and lend support to the as yet unproven hypotheses. Many uncertainties and assumptions accompany this research, and its theories have yet to be proven. As the Board's charter prohibits the conduct of scientific research, the Board took no action as a result of this presentation.

August 1999

The Board received detailed briefings from the Joint Staff and the Office of the Assistant Secretary of Defense for Health Affairs on DoD's Health Operations Policy and it Force Health Protection Program; met with a former director of the Defense Nuclear Agency; observed a meeting of the PGVCB Clinical Working Group; attended two VSO conventions.

September 1999

The Board observed a public hearing conducted by the Institute of Medicine regarding potential environmental exposure causality during the Gulf War; attended two VSO conventions.

October 1999

The Board received briefings from the PGVCB, DoD and the Department of Health and Human Services (HHS) on four PAC recommendations: risk communications program; DoD's implementation of previous PAC clinical and medical recommendations; waiver of informed consent; and the evaluation of policies and practices concerning the use of investigational products during deployments. The Board also attended a meeting of the PGVCB Clinical Working Group; monitored a meeting of the Persian Gulf Veterans Coordinating Board; and observed a House Committee on Veterans Affairs hearing. Dr. Melissa McDiarmid briefed Board representatives on the VA's long-term monitoring of Gulf War veterans with documented DU exposures resulting from friendly fire incidents.

November 1999

Board representatives received updates on the VA Health Registry and the DoD Comprehensive Clinical Evaluation Program; attended a House Committee on Veterans Affairs hearing; observed a meeting of the Institute for Medicine panel studying Gulf War illnesses; monitored OSAGWI's town hall meeting and unit briefings during the latter's installation visit to Fort Benning, GA.

January 2000

The Joint Staff briefed the Board on the 30-day deployment definition and serum sample repository, two key components of the Force Health Protection Program. OSAGWI met with the Board to explain its application of an objective standard in investigating chemical warfare incidents as recommended by the PAC in its Special Report.

February 2000

The Board received a briefing from the Department of Veterans Affairs regarding its response to two PAC recommendations regarding clinical and medical issues as well as the establishment of a permanent statutory program for Gulf War veterans' illnesses. The program manager for the Personal Information Carrier (PIC) updated the Board on the program and why cost and redesign requirements will not permit the addition of a location tracking capability. The Board also attended a House Committee on Government Reform hearing.

March 2000

Dr. Asaf Durakovic, a private physician with interests in DU and Gulf War illnesses, met with the Board to discuss the methodologies used in his testing of Gulf War veterans for potential DU exposures. Due to privacy considerations, Dr. Durakovic would not discuss any of his data.

May 2000

The Board received a briefing from the Mitre Corporation regarding its classified report on US intelligence on Iraqi chemical and biological warfare capabilities. The Board reaffirmed its Interim Report recommendation advising the Secretary of Defense to issue the Mitre Report in an unclassified form.

June 2000

The Board made a presentation at a Military Service Organization national convention.

July 2000

The Board observed an OSAGWI town hall meeting and unit briefings during the latter's installation visit to Fort Lewis, WA.

August 2000

The Board attended a VSO national convention; observed an Institute of Medicine hearing regarding Gulf War illnesses.

September 2000

The Board attended two VSO national conventions; observed an Institute of Medicine hearing regarding Gulf War illnesses; attended the first plenary session of the Military and Veterans Health Coordinating Board.

October 2000

The Board observed an OSAGWI town hall meeting and unit briefings during the latter's tri-service installation visit to Oahu, HI.

APPENDIX I

SPECIAL OVERSIGHT BOARD

SPECIAL REPORT

SPECIAL OVERSIGHT BOARD

FOR DEPARTMENT OF DEFENSE INVESTIGATONS OF GULF WAR

CHEMICAL AND BIOLOGICAL INCIDENTS

SPECIAL REPORT

NOVEMBER 1999

Table of Contents

Chapter 1

Background

During the July 13, 1999 Public Hearing, The Department of Defense (DoD) Office of the Special Assistant for Gulf War Illnesses (OSAGWI) out-year budget and manpower projections were presented along with the OSAGWI mission priorities and rationale. In addition, a conceptual transition plan for OSAGWI was introduced that included the rationale, missions and functions that should be transferred, and the relationship of the phase-out plans and the budget and manpower projections. The shifting emphasis from case narratives and environmental exposure reports to information papers was also discussed.

The Special Oversight Board for Department of Defense Investigations of Gulf War Chemical and Biological Incidents (Board) requested the Special Assistant to return in sixty days with a thorough review of the OSAGWI analyses in progress and recommend those case narratives and environmental exposure reports that should be revised and reissued, continued to completion, or discontinued.

The invitation was based on the following:

- Few medical or scientific studies to date definitively link GW chemical and biological events to servicemembers' or veterans' health problems.
- The Board wanted to explore the DOD's plan to shift focus from retrospective investigations of GW exposures to the medical aspects of troop health surveillance, monitoring and care before,

during and after operational deployments.

The Special Assistant presented his recommendations at the Board's scheduled September 1999 monthly meeting. This meeting was announced in the Federal Register, Vol. 64, No. 170/Thursday, September 2, 1999 on page 48145; held on September 16, 1999 at the Board offices; and open to the public.

Chapter 2

September 16, 1999 Meeting

The Chairman, Vice Chairman, three of the five Board members, and Board staff attended this meeting, at which the Special Assistant presented his project by project description of the cases currently under or awaiting investigation.

The presentation slides and backup supplementary materials summarized the genesis and status of each case. They also contained the recommended disposition of these cases. In several cases, the Special Assistant recommended termination of an investigation based on current findings or anticipated outcomes.

The Special Assistant supplemented the briefing with detailed one-page summaries of each case narrative and environmental exposure report. Open discussion took place between the Board members and the Special Assistant on the different elements of these reports, some of which were recommended for continuation, and some recommended for discontinuation.

The findings of both the United Nations (UNSCOM) and the Central Intelligence Agency (CIA) conclude that no chemical weapons were known to be or found to have been shipped south of Khamisiyah, Iraq. No information, including cases narratives published by OSAGWI, has been discovered or published to either refute or challenge the UNSCOM or CIA conclusions. These findings support both the Special Assistant's recommendations to the Board and the Board's action (on those recommendations) as enumerated in this report.

A complete transcript of the meeting is available in the Board offices, and at the Board's Internet web site at http://www.oversight.ncr.gov/

Chapter 3

Recommendations Based on OSAGWI Presentation and Plans

The following are the Board's action(s) with respect to the recommendations presented by the Special Assistant. The Board disapproved two of the Special Assistant's recommendations (*) listed below. Each of the Special Assistant's other recommendations were approved.

ACTIVITY	SPECIAL ASSISTANT'S RECOMMENDATION	BOARD ACTION
11TH MARINES II	**Continue and publish**	**Approved**

2nd Marine Recon Bn. Injuries	Discontinue	*Disapproved. Continue and publish
Air Campaign	Continue and publish	Approved
Al Jubayl, Saudi Arabia II	Continue and publish	Approved
Al Muthanna	Continue and publish	Approved
An Nasiriyah II	Continue and publish	Approved
ARCENT Possible Chem Weapons Site	Discontinue (contrary to PAC guidance)	Approved
Biological Warfare	Discontinue	Approved. Prepare a summary of info gathered to date and reason for discontinuation
Camp Monterey II	Continue and publish	Approved
Czech/French II	Continue and publish	Approved
Fox Alerts 24th ID	Continue and publish	Approved
Fox Information Paper II	Continue and publish	Approved
Fox (Vehicle) north of Tallil	Discontinue	Approved
Injured Marine	Continue and publish	Approved
JCMEC/TEU Info paper	Discontinue	Approved
Khamisiyah II	Continue and publish	Approved
Kuwaiti Girls School II	Continue and publish	Approved
M256 Detection Rafha	Continue and publish	Approved
MARCENT Possible Chem Weapons Site	Discontinue (contrary to PAC guidance)	Approved
Marine RSCALL (XM2) Alerts	Discontinue	Approved
Marine Breaching II	Continue and publish	Approved
Muhammadiyat	Continue and publish	Approved
Munitions Marking Info	Discontinue	Approved

Paper		
Possible Post-war CW use by Iraq	**Discontinue**	**Approved. Prepare a summary of info gathered to date and reason for discontinuation**
Reported Mustard Exposure II	**Continue and publish**	**Approved**
SCUD Info Paper	**Discontinue**	***Disapproved** **Continue and publish**
Tallil Air Base II	**Continue and publish**	**Approved**
Ukhaydir	**Continue and publish**	**Approved**
CARC Paint	**Continue and publish**	**Approved**
Depleted Uranium II	**Continue and publish**	**Approved**
Depleted Uranium final	**Continue and publish**	**Approved**
Oil Well fires II	**Continue and publish**	**Approved**
Particulate Matter	**Continue and publish**	**Approved**
Pesticides (Use in the Gulf War)`	**Continue and publish**	**Approved**
Retrograde Equipment	**Discontinue**	**Approved**
Water Contamination	**Discontinue**	**Approved**
GW Health Care Policies & Practices	**Discontinue**	**Approved. Recommend ASD(HA) and JCS review findings to date for follow-up. Forward to ASD(HA)**
Vaccine Administration	**Continue and publish**	**Approved. Publish (coordinate with ASD(HA))**
Saudi Arabia National Guard Study	**Continue and publish**	**Approved**

- **Notes: <u>Discontinue</u>: cease work, publish information available to date (summary format as appropriate) to include rational for discontinuation in final wrap up publication(s). <u>Continue and Publish</u>: as presented to the Board.**

Recommendation concerning OSAGWI Operations

In the Board's *Interim Report*, and in hearings conducted in July 1999, the Board recommended that the OSAGWI both report to the Board which on-going activities could be discontinued, and provide a phase-out plan for discontinuation of OSAGWI's investigative focused activities.

The Board believes OSAGWI can complete its mission by January 2001 based on the Special Assistant's observation that "we can reasonably complete our mission by January 2001. ..." The Board anticipates that OSAGWI activities for CY 2000 will focus on completion of the OSAGWI mission by this mutually agreed upon date.

The following Board comments apply to the other recommendations made by the Special Assistant:

- The Board concurs with the Special Assistant's recommendation that a follow-on organization be instituted to continue the outreach, investigative and deployment health related functions that OSAGWI currently performs.-
- The Special Assistant requested relief from certain unidentified PAC recommendations. The Board requests that the particular recommendation(s) be enumerated and the specific relief sought be requested in writing to the Board. The Board will respond as appropriate.
- The Board requests that the Department of Defense present to the Board, in March 2000, the proposed design of the "follow-on" organization.
- The Board recommends that the Department address the Board's observation that the mission of a DoD (OSAGWI) "follow-on organization" be defined in terms of the relationship to and functions of the new, presidentially-chartered and multi-agency, Military and Veterans Health Coordinating Board (MVHCB).

The Board invites the Special Assistant's attention to page 18 of the Special Oversight Board *Interim Report* that addresses "lessons learned". While this subject was not specifically addressed in the September presentation, the Board expects that the recommendation on page 18 will be acted on and addressed.

Drawdown and the proposed structure of a "follow-on" organization

Incident Analysis. The Board accepts the Special Assistant's recommendations and awaits the March 2000 briefing on the proposed organizational structure of the follow-on organization.

Veterans Data Management. The Board accepts the Special Assistant's recommendations.

The Board concurs with the proposal that all veterans' activities and outreach activities be combined into a single activity or sub-function of the follow-on organization. OSAGWI has demonstrated by its performance over the past several years, that individual veterans and VSOs continue to look to the DoD as a primary contact for matters affecting veterans who once served in a military service. Veterans and VSO's expect and deserve a formal relationship with their former employer (DoD).

- The Board recommends that the follow-on organization include a departmentally established element that addresses Veterans issues on behalf of the Department. As veterans' issues are of national, as well as Department and individual Service interest, the function should appropriately

be located in the Department of Defense organizational element (e.g. not in each individual military service).

Veterans Outreach. The Board accepts the Special Assistant's recommendations. Veterans outreach is imperative. DoD activities that foster comprehensive and robust dialog with and participation of veterans and veterans organizations are essential.

The Board conducted a public hearing at Fort Lewis, Washington on October 19, 1999. At that hearing, the American Legion representative petitioned the Board to consider the relationship that has been fostered by the Special Assistant and his OSAGWI organization and the veteran's community. In particular, the American Legion representative requested that the Board consider that the OSAGWI lessons learned activity might not be appropriately assigned to the Joint Staff. The speaker stressed that the veteran outreach functions of the DoD, as conducted by the OSAGWI staff, be maintained after OSAGWI's investigative activities have ceased.

However, the Board does not view "town hall" meetings as being the cornerstone of veteran outreach activity. Rather, as outlined above by the American Legion, the Board's sense is that DoD should maintain an "organic" veteran liaison function (within OSD, at the special assistant to the Secretary level) to carry-on the outreach work OSAGWI originated. Active and visible participation in VSO events, annual meetings, etc. and an "ombudsman" type function at OSD may prove to be the most productive of these activities. During the OSAGWI drawdown, the "town hall" outreach function should be discontinued, eventually, as it relates to the issue of Gulf War illnesses (target date by the establishment of the follow-on organization). If this effort should continue, OSAGWI should advise the Board how DoD, DHHS, and VA will be integrated into this, and other, future outreach efforts.

"Lessons Learned" The Board addressed the issue of "lessons learned" in its *Interim Report,* and recommended that "*...any continuation of the 'lessons learned' activity at OSAGWI be supported by a plan, approved and directed by the Secretary of Defense, that addresses and recognizes the formal integration of the OSAGWI lessons learned team into the existing Military Service and Joint Staff lessons learned infrastructure."*

The Board reiterates its recommendation that the OSAGWI "lessons learned" concept must be continued in some fashion and incorporated in the follow-on organization. The follow-on organization is envisioned as a "deployment" and "deployment issues" focused organization.

The individual Service doctrine commands can publish and disseminate appropriate lessons learned to insure that they are scripted for and sent to all echelons of each Service, and the Joint Staff can direct similar guidance to the Specified and Unified Commands.

Case Narratives and Environmental Exposure Reports

The Board recommends that OSAGWI identify a date in CY 2000, beyond which it will begin to draw down. OSAGWI should designate at the earliest possible time in the investigative process which case narratives will be identified as a "final report." No follow-on revisions of any report will be published.

Recommendation for Executive Action

The Board first met in November 1998. In accordance with the Executive Order 13075, the Board is required to submit a final report within eighteen months of the first meeting. If the Executive Order is not amended, a final report will be due in May 2000. The Board will then terminate before the end of

June 2000.

The Special Assistant has recommended, and the Board accepted and concurred, that the Board's tenure should be extended to coincide with the OSAGWI term to end not later than January 2001. This extension will allow the Board to provide continued oversight of the OSAGWI effort, through its transition to a "follow-on organization" and completion of on going or programmed case narratives, environmental exposure reports, and appropriate information papers.

The Board recommends that the Secretary of Defense request that the President amend Executive Order 13075 to read as follows:

- *Section 2. Functions. (e). The Special Oversight Board shall submit an interim report within 9 months of its first meeting, and a final report upon termination of the Board, unless otherwise directed by the President. The Board may submit Special Reports as determined by the Chairman.*
- *Section 4. General Provisions. (b) The Special Oversight Board shall terminate on January 20, 2001 unless otherwise directed by the President.*

APPENDIX J

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CHAPTER 5

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CHAPTER 7. STRESS

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APPENDIX K

GLOSSARY

A	
ASD-HA	Assistant Secretary of Defense for Health Affairs
ASP	Ammunition Supply Point
B	
BW	Biological Weapons
BWA	Biological Warfare Agent
Board	Presidential Special Oversight Board
C	
CAM	Chemical Agent Monitor
CARC	Chemical agent resistant coating
CBDP	Chemical and Biological Defense Program, DoD
CBW	Chemical Biological Warfare
CCEP	Comprehensive Clinical Examination Program
CDC	Centers for Disease Control and Prevention, DHHS
CHPPM	Center for Health Promotion and Preventive Medicine , U.S. Army
CIA	Central Intelligence Agency
CS	A riot control agent; "tear gas"
CW	Chemical Weapons or Chemical Warfare
CWA	Chemical Warfare Agent(s)

D	
DHHS	Department of Health and Human Services
DHSRP	Deployment Health Surveillance & Readiness Program
DIMHRS	Defense Integrated Military Human Resources System
DoD	Department of Defense
DU	Depleted Uranium
DVA	Department of Veterans Affairs
E	
EHA	Environmental Hygiene Agency, U.S. Army (succeeded by CHPPM)
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
F	
FACA	Federal Advisory Committee Act
FDA	Food and Drug Administration, DHHS
G	
GAO	General Accounting Office
GWI	Gulf War Illnesses
H	
HD	A blister CWA, Sulfur Mustard
HIV	Human Immunodeficiency Virus
HT	A blister CWA, HT Mustard
I	
IAD	Investigations and Analysis Division, OSAGWI

ICD-9-CM	International Classification of Diseases, Ninth Revision, Clinical Modification
IOM	Institute of Medicine
IRFNA	Inhibited Red Fuming Nitric Acid
J	
J-4	Logistics Directorate (includes Medical Readiness), The Joint Staff
JCS	Joint Chiefs of Staff
K	
L	
LLID	Lessons Learned Implementation Directorate, OSAGWI and OSAGWIMRMD
M	
MSO	Military Service Organization
MTF	Medical Treatment Facility, DoD (All medical centers, hospitals, and clinics)
MVHCB	Military and Veterans Health Coordinating Board
N	
NAS	National Academy of Sciences
NBC	Nuclear, Biological, and Chemical
NRC	Nuclear Regulatory Commission
NSC	National Security Council, Executive Office of the President
O	
ODS	Operations Desert Shield and Desert Storm
OSAGWI	Office of the Special Assistant for Gulf War Illnesses (succeeded by OSAGWIMRMD)

OSAGWIMRMD	Office of the Special Assistant to the Secretary of Defense for Gulf War Illnesses, Medical Readiness, and Military Deployments
OSD	Office of the Secretary of Defense
P	
PAC	Presidential Advisory Committee on Gulf War Veterans' Illnesses
PAO	Public Affairs Officel
PB	Pyridostigmine bromide
PFC	Private First Class
PGIIT	Persian Gulf Illnesses Investigations Team
PGVCB	Persian Gulf Veterans Coordinating Board
PIC	Personal Information Carrier
PRD-5	Presidential Review Directive 5. A National Obligation
Q	
R	
RFP	Request for Proposals
RC	Reserve Component
S	
SCUD	A short- to medium-range ballistic missile
T	
U	
UIC	Unit Identification Code
UK	United Kingdom

UNSCOM	United Nations Special Commission
U.S. or US	United States or United States of American
USA	United States Army
USA	United States of America
USMC	United States Marine Corps
V	
VA	Department of Veterans Affairs
VSO	Veterans Service Organization
W	
WRAMC	Walter Reed Army Medical Center
X	
Y	
Z	

APPENDIX L

ACKNOWLEGEMENTS

Michael Abreu

Jane Adderson

David Albreth

Michael R. Ange

Ross Anthony

Linda D. Austin

Patricia Axelrod

Sue Bailey

Heyward Bannister

Rick Barbarsky

Drue Barrett

Craig Bash

William Baumzweiger

D. Beasley

Catherine Beck

Robert Bergen

Rosalie Bertell

Keith Boylan

Bill Bradford

William Bradshaw

Kelley Brix

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Phillip R. Brown

Edward J. Bryan

Ed Bryant

Paul E. Busick

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Cameron Cathey

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Sal Cirone

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Albert Garcia

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Peter Gayton

Mark Gebicke

Timothy Gerrity

Beatrice A. Golomb

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John T. Graham

Allan M. Green

James B. Green

Alice Gross

Thomas Guilarte

John Haas

James H. Hager

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Michael Hamilton

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Virginia. Hazen

Jack Heller

L. Hernandez

Phil Heyl

Mike Hicks

Mary Highsmith

Mike Hix

Hank Hodge

Gary L. Hollis

Michael Hood

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Norma St. Clair

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Paul Sullivan

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Scott Zeger

Elmo R. Zumwalt, Jr

INTERNET DOCUMENT INFORMATION FORM

A. Report Title: Special Oversight Board for DoD Investigation of Gulf War Chemical and Biological Incidents

B. Report downloaded From the Internet: JANUARY 11, 2001

C. Report's Point of Contact: (Name, Organization, Address, Office Symbol, & Ph #): - ASSOCIATION OF THE US ARMY, 2425 Wilson Blvd., Arlington, VA 22201

D. Currently Applicable Classification Level: Unclassified

E. Distribution Statement A: Approved for Public Release

F. The foregoing information was compiled and provided by: DTIC-OCA Initials: __LL__ Preparation Date January 11, 2001

The foregoing information should exactly correspond to the Title, Report Number, and the Date on the accompanying report document. If there are mismatches, or other questions, contact the above OCA Representative for resolution.